







213

Department of  
PUBLIC HEALTH  
YALE SCHOOL of MEDICINE









FIRST ANNUAL REPORT

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF CONNECTICUT,

FOR THE

*Fiscal Year Ending November 31, 1878.*

---

Printed by Order of the Legislature.

---

HARTFORD, CONN.:

PRESS OF THE CASE, LOCKWOOD & BRAINARD COMPANY.

1879.





STATE OF CONNECTICUT,  
OFFICE OF THE  
SECRETARY OF THE STATE BOARD OF HEALTH,  
HARTFORD, December, 1878.

*To His Excellency R. D. Hubbard, Governor of Connecticut:*

SIR,—In compliance with the laws of this State, I have the honor to present to you the accompanying report for the fiscal year ending November 30, 1878.

Very respectfully,

C. W. CHAMBERLAIN,  
*Secretary of the State Board of Health.*

## AN ACT ESTABLISHING A STATE BOARD OF HEALTH.

GENERAL ASSEMBLY, JANUARY SESSION, A. D. 1878.

*Be it enacted by the Senate and House of Representatives in General Assembly convened :*

SECTION 1. That the governor, by and with the advice and consent of the senate, shall appoint six persons, three of whom shall always be physicians, and one lawyer, who, together with a secretary to be elected by them, shall constitute the State Board of Health. Of the six persons first appointed, two shall serve for two years, two for four years, and two for six years, from the first day of July next following their confirmation, and the governor shall hereafter biennially appoint, by and with the advice and consent of the senate, two members of said State Board of Health, to hold their offices for six years from the first day of July next following their confirmation. If a vacancy occur in said board during a recess of the legislature it shall be filled by the governor until the next regular session of the same.

SEC. 2. That the State Board of Health shall meet at least once in every three months, and as much oftener as they may deem proper. Four members shall always constitute a quorum for business. No member of the board shall receive any compensation except the secretary, but the actual traveling and other expenses of the members while engaged in the duties of the board shall be allowed and paid out of the appropriation made for its support. They shall select annually one member of the board as president, and shall appoint a suitable person, who shall be a physician, to be their permanent secretary and executive officer, who shall hold his office so long as he shall faithfully discharge the duties thereof, but who may be removed for cause at any meeting of the board, a majority of the members voting therefor. If a member of the board be elected as secretary the vacancy thus caused shall be filled by the governor, as provided in section first.

SEC. 3. That the secretary shall keep a record of the acts and proceedings of the board, perform and superintend the work prescribed in this act, and such other duties as the board may order under their general direction, and shall receive an annual salary of one thousand dollars, which shall be paid him in the same manner as the salaries of other State officers are paid, and such necessary expenses as the comptroller of the treasury shall audit, on the presentation of an itemized account, with vouchers annexed and the certificate of the board, shall be allowed him.

SEC. 4. That the said State Board of Health shall take cognizance of the interests of health and life among the people of this State; they shall make sanitary investigations and inquiries respecting the causes of disease, and



especially of epidemics, the sources of mortality, and the effects of localities, employments, conditions, *ingesta*, habits, and other circumstances upon the public health; and they shall collect such information in respect of these matters as may be useful in the discharge of their duties, and contribute to the promotion of health and the security of life in this State; they shall cause to be made by their secretary or by a committee of the board, inspections at such times as they may deem best, and whenever directed by the governor or the legislature, of all public hospitals, prisons, asylums, or other public institutions, in regard to the location, drainage, water supply, disposal of *excreta*, heating and ventilation, and other circumstances in any way affecting the health of their inmates, and shall also suggest such remedies as they may consider suitable for the removal of all conditions detrimental to health in the said institutions, in writing, to the officers thereof.

SEC. 5. That the said board shall cause all proper sanitary information in its possession to be promptly forwarded to the local health authorities of any city, village, town, or county in this State, which may request the same, adding thereto such useful suggestions as the experience of said board may supply. And it is also hereby made the duty of said local health authorities to supply the like information and suggestions to said State Board of Health, together with a copy of all their reports and other publications. And said board of health is authorized to require reports and information (at such times and of such facts, and generally of such nature and extent, relating to the safety of life and promotion of health, as its by-laws or rules may provide) from all public dispensaries, hospitals, asylums, infirmaries, prisons, and schools, and from the managers, principals, and officers thereof; and from all other public institutions, their officers and managers, and from the proprietors, managers, lessees, and occupants of all places of public resort in the State; but such reports and information shall only be required concerning matters or particulars in respect of which it may in its opinion need information for the proper discharge of its duties. Said board shall, when requested by public authorities, or when they deem it best, advise officers of the state, county, or local government in regard to sanitary drainage, and the location, drainage, ventilation, and sanitary provisions of any public institution, building, or public place.

SEC. 6. That it shall be the duty of the state board to give all information that may be reasonably requested, concerning any threatened danger to the public health, to the local health officers, and all other sanitary authorities in the State, who shall give the like information to said board; and said board and said officers, and said sanitary authorities shall, so far as legal and practicable, co-operate together to prevent the spread of disease, and for the protection of life and the promotion of health, within the sphere of their respective duties.

SEC. 7. That said board may, from time to time, engage suitable persons to render sanitary service and to make or supervise practical and scientific investigations and examinations requiring expert skill, and to prepare plans and reports relative thereto. And it is hereby made the duty of all boards and agents, having the control, charge, or custody of

any public structure, work, ground, or erection, or any plan, description, outlines, drawings, or charts thereof, or relating thereto, made, kept, or controlled under any public authority, to permit and facilitate the examination and inspection, and the making of copies of the same by any officer or person by said board authorized; and the members of said board, and such other officer or person as may at any time be by said board authorized, may, without fee or hindrance, enter, examine, and survey all such grounds, erections, vehicles, structures, apartments, buildings, and places.

SEC. 8. That it shall be the duty of the State Board of Health to have the general supervision of the State system of registration of births, marriages, and deaths. Said board shall prepare the necessary methods and forms for obtaining and preserving such records, and to insure the faithful registration of the same in the several counties, and in the central bureau of vital statistics at the capital of the State. The said board of health shall recommend such forms and amendments of law as shall be deemed to be necessary for the thorough organization and efficiency of the registration of vital statistics throughout the State. The secretary of said board of health shall be the superintendent of registration of vital statistics. As supervised by the said board, the clerical duties and safe keeping of the bureau of vital statistics thus created shall be provided for by the Comptroller of the State, who shall also provide and furnish such apartments and stationery as said board shall require in the discharge of its duties.

SEC. 9. That the said board, on or before the first day of December in each year, shall make a report in writing to the governor, upon the vital statistics and the sanitary condition and prospects of the State, which report shall also set forth the action of said board, and its officers and agents, and the names thereof for the past year, and shall contain a full statement of their acts, investigations, and discoveries, with such suggestions for further legislative action or other precautions as they may deem proper for the better protection of life and health. This report shall also contain a detailed statement of the moneys expended by said board, and the manner of their expenditure the year for which it is made; but the total amount paid for the expenses of this board, including the salary and expenses of the secretary, shall not exceed three thousand dollars, which amount is hereby annually appropriated for this purpose, to be paid by the treasurer, on the comptroller's warrant, in such sums as the certificate of the board, with proper vouchers annexed, may certify from time to time.

SEC. 10. That this act shall take effect from the date of its passage; and that all acts or parts of acts inconsistent herewith, be, and the same are hereby, repealed.

## GENERAL REPORT.

---

The requirement of a report in December renders this first report necessarily incomplete, as the returns from the registrars of vital statistics are not made until the last of January of the ensuing year, and the report on vital statistics cannot be made until our second annual report, from the nature of the subject. This report therefore covers but the brief period of five months, and notwithstanding the little time we have had in which to work, it is hoped that this first report even may be of interest and value to the people of the State, in whose behalf we labor. The following statement explains our plans and methods thus far:

The work entered upon during the first few months, must, in the nature of things, be, to a great extent, of a preliminary or preparatory character. Before entertaining any very comprehensive plans, a survey of the field, and exact knowledge of the sanitary condition and requirements of the State was needed, to secure a solid basis of fact, preparatory to action. [The work of organizing the board and bringing it into communication with the people, was obviously among the first to be undertaken. To awaken intelligent interest in sanitary science, and demonstrate its practical utility not only in preventing disease and prolonging the average duration of life, but also in securing healthy and efficient lives would excuse the devotion of a much greater period of time to the sole endeavor to develop a public sentiment that shall regard a neglect of plain sanitary principles as criminally careless.]

In the systematic effort to bring clearly before the people of this State the value of sanitary science, and to show what it has accomplished, and can accomplish for families, communities, and states, the following plan has been followed for the most part: 1st, To assign to each member of the Board some special field for work and investigation, the results as they take shape to be printed in our reports. 2d, By publications, short and concise, explaining in general terms the nature and scope of public hygiene, and our



objects and aims. {The following circular was sent to every clergyman in the State, as "the same causes which produce physical disease, foster also immorality, degradation, and social misery. Uninhabitable habitations, foul air, neglect of personal and public cleanliness, insufficient sanitary appliances, are not only factors of disease but of moral degradation."}

The appeal to the clergy was rendered appropriate, too, from their position as public instructors, since they as a class are among the most public-spirited of our citizens, and from the nature of their work come into close relations with all classes of society.

### CONNECTICUT STATE BOARD OF HEALTH.

#### TO THE CLERGY OF THE STATE OF CONNECTICUT:

*Rev. Sirs,*—As you are probably aware, the Legislature at its last session passed the act creating a State Board of Health. We desire the co-operation of all interested in the welfare of humanity in our work. As unsanitary conditions have a close and perhaps causative relation to want and misery, and foster the development of vice and crime, we make a special appeal to you for aid.

Great advances have been made of late in ascertaining the causes and prevention of disease, and controlling the contagious and infectious diseases which form an unnecessarily large element in the production of sickness and death in our own State. The knowledge of the means of preventing and controlling these evils to a very great extent has already been gained, and it is only necessary to diffuse it among the people and act upon it to reap the results in the improvement of public health, the promotion of public happiness, and the prolonging of human life. To carry out these measures extensively, requires some public agency and the support of all classes of the community. The work of the Board in some of its principal features might be thus outlined:

To instruct the people as to the causes and prevention of disease; to study the local influences affecting health,—race, population, soil, water supply, drainage, food, labor, climate, productions, social conditions, etc.,—to obtain accurate and reliable statistics relating to birth, marriage, and death rates, and their relations to race, sex, age, etc.; to watch the appearance of infectious and contagious diseases and study them as influenced by local conditions, and to take measures to control them; to study unsanitary conditions as they exist amongst us, and to recommend measures for relief; to organize and systematize the work throughout the State, by encouraging the formation of local health boards.

We desire correspondents in each town and village concerning our work, and would solicit from you, in addition to what aid you can give us in this direction, the names of those, one or more, in your localities who would act as regular correspondents and properly represent the district. All blanks, etc., for correspondence will be furnished on application to the Secretary.

The responses received to this were most encouraging, and the generous promises of aid fully realized when called for.

The circular on public hygiene is designed for more general distribution, and special editions, varied somewhat, have been sent to every physician in the State, to members of the learned professions, men in public stations and the like, and to any desirous of comprehending the general nature of sanitary work. Two thousand copies of this have been circulated.

### PUBLIC HYGIENE.

“The aim of public hygiene is to arrest or prevent, by official measures, all diseases which are not, in their nature, strictly limited to the individual, but which, from external causes, or from their specific characters, have a tendency to spread throughout families, institutions, and communities, and which cannot be otherwise controlled.”

Sanitary science has proved that many of the diseases which act as the principal factors in producing death, are preventable and controllable by practical hygienic measures from the neglect of which not only are many precious lives wasted every year, but many also crippled and dwarfed by disease; lucrative enterprises abandoned; hopes blasted, and poverty and want induced, if not pauperism, vice, and crime, from the distress caused by the losses resulting from unnecessary sickness and death.

It costs to be sick, and more to die; and if we simply estimate the cash value of the lives wasted each year, during the productive period of life in this State, the sum would be expressed in many millions of dollars. This estimate rests upon the same basis used by the great business men of the world, the statesman and scientist, and is as reliable also in sanitary science.

Although the general principles concerning the prevention of disease have been long known and published, still the knowledge has been confined to a few, and consequently their application has been limited, and it is not until the elements of sanitary science are known and appreciated by every citizen that the desired results can be fully attained in the prevention of disease and death, the preservation of health, the prolonging of human life, and the promotion of public wealth and prosperity.

Says Disraeli, “The health of the people is really the foundation upon which all their happiness and all their power as a state depend. The health of the people is, in my opinion, therefore, the first duty of the statesman; and I am confident that there is no object of higher importance to engage the interests of society.”

Great advances have been made during the last few years in sanitary science, in relation to the causes of disease and the control of epidemic, infectious, and contagious diseases. To systematically disseminate this knowledge among the people, and carry out the necessary measures extensively and throughout the State requires some public agency, and this work the State Board of Health propose to inaugurate and carry out.

The prosperity of any community, and its comparative healthfulness, are inseparably connected, and unsalubrious conditions effectually check development and growth. It is a part of our work to investigate the local conditions affecting health and longevity in the State; and here the value of registration of vital statistics becomes apparent, showing that diseases appear irregularly and with certain conditions, increasing or decreasing as these conditions vary.

Besides the great value in the work of the Board of the complete return of vital statistics we hope to secure, the legal and historic value of complete statistics is unquestionable in relation to Probate Courts, and in securing titles, in deciding questions of legitimacy, settlement, and descent, in their relations to life insurance, annuities, endowments, and in establishing the claims upon government for pensions. Unless their attention has been especially directed to the subject, but few are aware of the interests involved in a complete return of vital statistics in any community in relation to the art of healthy living, and in promoting the best interests of society.

The value of family training, of the heritage of unvitiated constitutions, the penalties of vicious living exacted from succeeding generations, and in fact all the varied agencies that war against health and life can only be fully appreciated by reviewing the life-history of many successive generations from the cradle to the grave. The welfare of the living, duty to the dead that their loved ones should not be inconvenienced or defrauded by negligence to secure the protection thus offered, and the ends of public justice, public order, and public morality in securing every safeguard that the law throws around the sanctity of marriage, the legitimacy of birth, and the burial of the dead, as well as the aid thus afforded to the prevention of crime, alike demand that these records shall be *complete, prompt, and faithful*.

The work of the State Board of Health, thus briefly sketched in some of its aspects, affecting as it does the interests of the public at large, and having for its central aim and purpose the promotion of public prosperity, and a "race of healthy, vigorous, long-lived, moral human beings which sanitary administration tends to produce," can depend upon no one profession or class for support, but must enlist the sympathies and co-operation of all in dealing with interests so complex and varied. The value and power of sanitary administration has been so thoroughly tested that we appeal with the utmost confidence for that assistance and co-operation we need in forming local organizations throughout the State, and rendering of practical benefit the knowledge and powers now available in the prevention of disease and death.

In no other way can the cause of rational scientific medicine be so well advanced or medical superstitions of every form dissipated, as by teaching the people the true nature of disease, its causes and prevention. Nor can we as physicians better secure for our profession its true place and influence in the State than by working in the field opened to us by the creation of this Board. We therefore appeal especially and confidently to the physicians of the State for their aid; we desire special correspondents in

every town who will report upon the public health and local sanitary affairs. All blanks necessary for correspondence will be furnished by the Secretary. Especial attention is called to the digest of registration laws, and regular monthly returns to the registrars earnestly solicited. The value of vital statistics depends upon their comparative completeness and exactness, and this can only be secured by regularity and promptness in the individual returns.

By order of the Board,

C. W. CHAMBERLAIN, M.D.,

*Secretary State Board of Health.*

3d. By the publication of plain and simple statements concerning the nature of some special form of disease, the manner in which it spreads, its causes, and practicable directions for prevention and control. As diphtheria has been very prevalent in this State, and is likely to become endemic unless systematically resisted, it was selected as the first of a series of health manuals which will be extended to embrace such subjects as are most closely related to healthy living, and in relation to which ignorance and negligence are most harmful. This is intended for general distribution to all school boards, health authorities, clergymen, physicians, and to the people generally, and to be kept on hand for use whenever called for.

## RESTRICTION AND PREVENTION OF DIPHTHERIA.

### GENERAL RULES AGAINST INFECTION.

Pure air, pure water, proper food and clothing, are essential conditions of health. *Cleanliness, dryness, and ventilation*, in and around dwellings and places of public resort, are the surest safeguard.

No house refuse, filth, excremental matter, or foul dirt should be allowed to remain about inhabited dwellings.

Filthy, foul, and *damp* places, saturated with sink or slop water, and shaded by vegetation or otherwise, near dwellings or places of public resort, should be purified, cleansed, and dried, and as free access of air and sunlight provided as possible. They foster, nourish, and render more fatal, if they do not produce pestilential diseases.

Disinfection should be thoroughly and persistently used at the appearance of a contagious disease. Disinfectants destroy contagion that would otherwise spread and multiply.

All sewer connections should be trapped and *ventilated*.

Nurses and attendants should spend some time each day in *pure air*, and take out-of-door exercise whenever possible, but at such times as to avoid contact with others.

## DIPHTHERIA

Is an infectious and contagious disease, though not as contagious as scarlet fever or small-pox, still requiring great precaution. Children are more liable than adults, and may convey it to one another, or it may be conveyed to them by adults.

The infection clings to articles in the room where cases have occurred, causing a reappearance of the disease, and after a single case it often breaks out in many places, always within a restricted area, sometimes gathering strength in its passage. Hence the importance of thorough disinfection. Unsanitary conditions favor its spread and increase its malignancy.

It is contagious by the exhalations from the sick, contaminating the air of the sick-room *in proportion to the severity of the case*, and the extent of the membrane in the throat; by direct contact with infected articles, *e. g.* by the use of eating or drinking utensils, towels, handkerchiefs, etc., used about the sick. It is conveyed by the diphtheritic membrane coming into contact with any mucous surface (*e. g.* mouth or nose), through kissing, sneezing, or coughing. The poison usually enters the system through the throat and upper air-passages.

## RULES FOR PREVENTION.

*First.* ISOLATE THE SICK in a well-ventilated room, preferably the uppermost room in the house. Place the bed so as to be accessible on all sides. Allow no person to enter except the necessary attendants. *In malignant cases* allow no one to go from the house to school, or to any public assembly.

*Second.* In preparing the sick-room remove all unnecessary articles of furniture. Carpets, curtains, and table covers are especially liable to retain infection. After use the room should be cleansed and ventilated, and in malignant cases, disinfected thoroughly.

*Third.* All bed and body clothing, towels and handkerchiefs used by the sick, as soon as removed, should be placed in vessels containing disinfecting fluids, and never be washed with other household articles. All plates, cups, glasses, spoons, and the like, used by the sick, should be rinsed with some disinfectant and washed separately.

*Fourth.* Nurses and attendants should wear only washable garments, and use disinfected water, for hands, unsparingly. Physicians and clergymen should be provided with disinfected water for their hands on leaving the sick room.

*Fifth.* All scraps of linen used in receiving discharges from the mouth or nose should be immediately burned. All receptacles for filth should be thoroughly disinfected.

*Sixth.* CHILDREN should not be allowed to attend the funerals of those dying from diphtheria. Disinfectants should be used freely in the room and about the body while it remains unburied. The coffin should never be opened at funerals to expose the dead to the public.



## DISINFECTANTS.

The following disinfectants are recommended by the Board:

FOR DISINFECTING PRIVIES, ASH-PITS, CESSPOOLS, DRAINS, AND OTHER  
OFFENSIVE PLACES.

Fifty pounds of copperas (sulphate of iron, green vitriol) to a barrel of water.

This may be dissolved in a smaller quantity of water, and then diluted. It may be used freely and repeated as often as odors arise. It is cheap and efficient. About four gallons are required to disinfect an ordinary vault used by one family. A smaller quantity may then be poured in occasionally.

FOR SINK-PIPES AND WATER-CLOSETS.

One pound of nitrate of lead to a gallon of water. Use freely.

FOR ARTICLES OF CLOTHING, ETC., USED ABOUT THE PATIENT.

Sulphate of zinc, eight ounces, crude carbolic acid, one ounce, warm water, four gallons.

Throw all articles of body linen, sheets, etc., at once into this solution and boil in clear water. In malignant cases such articles should be boiled in this solution, diluted with an equal quantity of water, previous to boiling in soap and water. It can be used freely in the sick-room. It does not stain. A towel may be wet with it and hung in the room. A sheet may be hung across the entrance hall or door and kept constantly wet with it. Nurses and attendants will find it well to occasionally wash their hands in this fluid.

Bromo-chloralum, diluted with eight or ten parts of water, can be used in the sick-room for wetting towels and sheets, as above described, and for washing the hands, when the odor of carbolic acid is offensive, as it is odorless.

4th. By securing correspondents in every town in the State, who are intelligently interested in sanitary subjects, or willing to become so, and who will act as a medium of communication between us and the people, as sanitary reporters concerning prevalent diseases and all local conditions relating to health, and aid in securing a sanitary history of each place, to be kept continuous hereafter by the aid of such reports and the mortality returns. Correspondents have already been secured in most of the towns of the State. Blanks 1 and 2, for country and village, commence the sanitary history, and the following postal card blank serves for regular correspondence concerning prevalent diseases. This system of correspondence is of course a permanent and important part of the organization of the Board, and inseparably connected with its successful working:



*Estimated Population,*

REPORT FOR

*for the**ending*

187

DISEASES.	Prevalence and Severity.	No. of Deaths.
1 Small-Pox, -		
2 Scarlet Fever or Scarlatina, -		
3 Diphtheria, -		
4 Typhoid Fever, -		
5 Intermittent Fever, -		
6 Typho-Malarial Fever, -		
7 Cholera Infantum, -		
8 Cerebro-spinal Meningitis, -		
9 Croup, -		
10 Whooping Cough, -		
11 Dysentery, -		
12 Diarrhoeal Diseases, -		
13 Consumption, -		
14 Acute Lung Diseases, -		
Total number of Deaths, -		

[Please note UNUSUAL causes not specified and the PREVALENCE OF ANY DISEASE, as far as you know of them. Give approximate number of cases. Indicate severity by + if more than usual; by — if less.]

## REMARKS.

*Signature.*

STATE BOARD OF HEALTH.

BLANK No. 1.

*Town of*

187

*Reporter.*

1. Estimated population.
2. Estimated number of acres.
3. Principal occupations of inhabitants.
4. Trades or manufactures carried on.
5. Principal crops raised.
6. Principal fruits cultivated.
7. Average acreage of woodland.
8. Principal kinds of timber.
9. Nature of soil.\*

---

\* Clay, sandy, gravelly, etc.

10. Favorable or not for natural drainage.
11. Estimate acres of low, wet, undrained land.  
Swamps and marshes.
12. Estimate number of acres drained during last five years.
13. Disturbance of natural drainage by reservoirs, dams, embankments,  
or excavations.
14. Note any disturbance of health following.
15. Streams, ponds, and other bodies of water.
16. Bodies of stagnant water.
17. Beds of what streams or ponds are dry, wholly or partially, and dur-  
ing what periods?
18. What are the ordinary diseases?\*
19. Sources of drinking water.
20. Quality of water (whether hard or soft, and other qualities).
21. Average depth of wells. Shallowest. Deepest. No. of artesian.
22. Average distance of privies from wells. Least.
23. Average distance of outlet of sink-drain from well. Least.
24. Average distance of outlet of sink-drain from house.
25. Condition of privies connected with school-houses.
26. Number of paupers, and how cared for.
27. Mention what, in your opinion, are the principal sources of danger to  
life and health; and any unsanitary conditions that exist and are  
likely to produce disease.
28. Mention any unusual cases or forms of sickness.
29. How completely are the registration laws concerning births, mar-  
riages, and deaths, observed?
30. What proportion of births occur without the attendance of a physi-  
cian, and how can the registration of these be secured?

## STATE BOARD OF HEALTH.

BLANK No. 2.

*Town of**187**Reporter.*

1. Estimated population.
2. Nationalities represented: estimated proportion.  
Estimate number living in tenement houses.\*  
" " " boarding houses.
3. Trades or manufactures.
4. Health of employees: mention any liabilities to disease incurred.
5. Number families in a tenement house: average. Greatest. Least.  
Number of employees living in cottages.
6. Estimated number employees in each branch.
7. Nature of soil.†
8. What provisions for drainage, carrying off surface water?

\* In order of prevalence.

† A house occupied by three families is considered a tenement house.

‡ Clay, sandy, gravelly, etc.

9. Natural drainage: streams, rivers, &c.
10. Ponds and bodies of stagnant water.
11. Beds of streams, ponds, &c., dry or partially, and during what periods?
12. Area drained by sewers.  
Number of miles of sewers.
13. Sewers empty into what?

If no sewers, give relations of privies and sink drains to wells, as to distance and natural drainage.

14. Sources of drinking water.
15. Quality of water (whether hard or soft, and other qualities).
16. Average depth of wells.  
No. of Artesian.
17. Number of cisterns used for drinking water.  
Number provided with filters.
18. House refuse and filth: how disposed of?
19. Is there any local health organization?
20. If so, is it active and efficient?
21. Condition of privies, water closets, etc., connected with school-houses.
22. Number of paupers, and manner of support.
23. Public institutions for charity or correction.
24. Mention principal diseases prevalent.
25. Principal sources of danger to life and health.
26. How completely are the registration laws observed?
27. What improvements are most needed?
28. Sources of artificial illumination.

5th. By means of lectures on sanitary subjects adapted to the requirements of each locality. This work, commenced but lately, will be followed more extensively during the present winter.

6th. By monthly reports of the sanitary condition of the State, and the prevalent diseases, with such suggestions as these warrant and illustrate. The *mortality* reports are at present confined to Hartford and New Haven, and it was not until September, after persistent effort, that such report could be secured from Hartford, so imperfectly are the registration laws observed. It is hoped that more extensive reports can be secured next year.

This preliminary statement explains the general work determined upon by the board for the first half year. The specialized work will be found under the proceedings and special reports.

## PROCEEDINGS

*of the Connecticut State Board of Health and Bureau of Vital Statistics for the five months ending November 30th, 1878.*

The following gentlemen were appointed by His Excellency Governor Hubbard, and approved by the Senate in accordance with the act of March 27, 1878:

Dr. J. S. Butler, Hartford, two years.

A. C. Lippitt, New London, two years.

A. E. Burr, Hartford, four years.

Dr. R. Hubbard, Bridgeport, four years.

Dr. C. A. Lindsley, New Haven, six years.

Prof. W. H. Brewer, New Haven, six years.

A preliminary session for completing the organization of the Board was held April 9th, at the U. S. Hotel, Hartford.

Dr. Lindsley was chosen secretary of the meeting, Dr. J. S. Butler of Hartford, was elected president for 1878-9, and Dr. C. W. Chamberlain of Hartford, permanent secretary.

Dr. Butler addressed the Board substantially as follows:

*Gentlemen,*—There is such a remarkable ignorance even among the more intelligent classes of the community in regard to the general laws of hygiene, that it becomes the first duty of the State Board of Health to take measures to enlighten the public mind, not only upon some of the main principles, but upon not a few of the details of public hygiene, or "State Preventive Medicine." This can be best effected,

1st. By lectures from members of the Board and others on general and special topics.

2d. By meetings for discussion of these topics, in various parts of the State.

3d. By delegations to the meetings of the various county medical societies.

4th. By distribution to every physician in the State, of reports and papers on sanitary subjects—such, for instance, as Dr. Daggett's and Dr. Lindsley's, in the Report of the New Haven Board of Health.

And, above all other means, by inducing every newspaper in the State to insert brief, compact, and frequent articles, showing what State preventive medicine is, its aims, duties, and necessities, in its various departments, and to see to it that such articles are duly prepared. We have ever found the press ready to give the aid of its great power to such humane objects.

By these and other means the Board must seek so to instruct and interest the public mind generally, and especially the medical profession, as among other results, to insure the establishment of an efficient Board of Health in every city and town in the State.

It is suggested that some of the most important topics be assigned to different members of this Board, to be reported upon at some future meeting, in such brief form as to admit, when printed, of cheap and general distribution, and to insure as far as possible the perusal of such reports by all, even the busiest man and woman in the State.

A general discussion of the topics suggested in the address followed, and of the methods best adapted to render this organization of practical utility to the people. With reference to that point in the address, on motion of Prof. Brewer the secretary was directed to address direct communications to the various medical organizations in the State, inviting their coöperation.

On motion of Mr. Burr, the secretary was directed to correspond with other State Boards of Health, and authorized to visit, personally, any societies or neighboring State Boards, if the interests and working of this Board would be directly promoted thereby.

On motion of Dr. Lindsley the secretary was directed to prepare a circular letter to registrars, advising them of the changes in the law, with such instructions as were necessary, and to report at the next meeting.

The following standing committees were then appointed:

On State Medicine and Public Hygiene—Dr. J. S. Butler.

Sanitary Legislation—A. C. Lippitt.

Protection of Buildings from the Gases of Decay—Prof. W. H. Brewer.

Vital Statistics—Prof. C. A. Lindsley, Dr. C. W. Chamberlain, *ex officio*.

Pollution of Rivers and Water Supply—Prof. W. H. Brewer.

Epidemic, Endemic, and Contagious Diseases—Dr. R. Hubbard, Dr. C. W. Chamberlain, Prof. C. A. Lindsley.

On By-Laws and Regulations—Dr. J. S. Butler, Dr. C. W. Chamberlain.

A preliminary session was held June 20th, at 2.30 P. M. Present, Drs. Butler, Lindsley, Prof. Brewer, A. E. Burr, A. C. Lippitt, and Dr. C. W. Chamberlain. The minutes of the preceding session were read and approved.

The secretary reported a plan for a postal-card system of correspondence, prepared to serve both as a return of the mortality

and of prevalent diseases. The irregularity with which returns were made to the registrars rendered both systems necessary.

The following draft of a letter sent to the various medical societies was presented:

*Gentlemen of the*

*Medical Society:*

As known to most of you, the Legislature, at the last session, passed the Act creating a State Board of Health and Bureau of Vital Statistics, thus adding this State to the number recognizing the value of the aid rational medicine can give in securing true prosperity to the State. The majority of the States of the Union now possess such organizations, and the number is yearly increasing. The success of this Board must at the outset depend largely upon the hearty coöperation of the physicians, not only individually but in their associated action and in their relations to society. We earnestly commend the subject to your consideration and discussion, and would suggest that you appoint a Committee on Public Hygiene to act more directly as our auxiliaries. We ask also your individual assistance as correspondents, and in securing prompt and regular returns of vital statistics. We also take this opportunity of soliciting careful attention and prompt replies to such circulars of inquiry as may be sent from the Board from time to time.

By order of the Board,

C. W. CHAMBERLAIN, M. D.,  
*Secretary.*

The following circular was sent to registrars through the State:

[Circular No. 1.]

STATE OF CONNECTICUT.

HARTFORD, CONN., June, 1878.

*To the Registrars of the State of Connecticut:*

*Gentlemen,*—As you are probably aware, the superintendence of the system of Registration of Vital Statistics passes into the hands of the State Board of Health July 1, 1878. All applications for blanks after that date, and for record books, forms for abstracts, etc., should be addressed to the Secretary State Board of Health. We desire your hearty coöperation in our endeavors to secure a better execution of the registration laws and a complete return of the vital statistics of the State. The especial points we ask your immediate attention to are these, and we will do all in our power to assist in their accomplishment:

1. To secure prompt returns, every month, of births, marriages, and deaths, as the law directs.
2. To diminish the number of deaths reported as from "cause not stated" or "ill-defined" which forms too large a proportion of our returns. If the cause of death be not stated, the reason why it is not stated should be given, and no incomplete certificates should be accepted when possible to secure the facts required by law.



We desire regular correspondents among the registrars concerning not only vital statistics, but all matters relating to public hygiene. All stationery, blanks, etc., for this purpose, will be furnished by the Board. Any person, interested in sanitary matters, who can thus aid us, are requested to send names to the secretary, and any suggestions concerning their localities that may be of use to the Board.

C. W. CHAMBERLAIN, M.D.,  
*Secretary State Board of Health.*

A quarterly meeting of the State Board of Health was held July 6, 1878, at 2.30 P. M. Present, Drs. Butler, Lindsley, Hubbard, and Chamberlain, and Prof. W. H. Brewer.

On motion of Dr. Hubbard, the proceedings of the preliminary sessions were ratified.

Dr. C. W. Chamberlain was elected treasurer, and Dr. J. S. Butler, Prof. W. H. Brewer, and the treasurer were elected as financial committee.

The following By-Laws were reported, and adopted unanimously:

#### BY-LAWS AND REGULATIONS.

No paper shall be published in the annual reports unless ordered by a majority vote. All papers shall be published over the author's signature, who shall be considered as responsible for all statements of facts and opinions therein contained.

No bills shall be paid unless endorsed by two members of the financial committee.

The Secretary shall prepare and submit to the board from time to time such general and special circulars as he may deem expedient.

Any member or committee appointed for any special purpose by the board shall have free use of all blanks, forms, etc., requisite for use in securing such object, and the Secretary may extend such courtesy to any one not a member of the board who will give the right of the publication of his researches to this board, provided that such researches be directly connected with the work of this board in some of its departments.

The election of those officers which are chosen annually shall be held in January.

The following shall be the regular order of business in the stated meetings of the board:

#### ORDER OF BUSINESS.

1. Reading Minutes of Last Meeting.
2. Reading Communications.
3. Report of Secretary.
4. Reports of Committees.
5. Business left over.
6. New and Miscellaneous Business.

Dr. Hubbard presented a plan for studying the diseases prevalent in any place, with reference to area of sewerage, altitude, drainage, soil, etc. It was voted that Dr. Hubbard prepare a report for the city of Bridgeport upon such a basis.

Upon motion of Professor Brewer, the secretary was directed to prepare a digest of the requirements of the registration laws for general circulation.

The pamphlet on diphtheria was submitted by the secretary, and after discussion and amendment, ordered printed for general distribution.

The committee on vital statistics presented a form of death certificate, which, after discussion and amendment, was adopted as follows:

### STATE OF CONNECTICUT.

#### CERTIFICATE OF DEATH.

*To be returned to the Registrar of the Town in which the Death occurred within the first week of the month after death.*

I certify, from the best information which I can obtain, that

1. Name, in full.

[Maiden name, if a married woman or widow.]

2. Place of Death, Town, . No. Street.

[If a tenement house, by how many families inhabited.]

3. Date of death.

4. Age, Years, Months, Days.

5. Sex, Color, or Race.\*

6. Single, married, or widowed.†

7. Birthplace, Town, State or Country.

8. Residence at time of death, Town, State or Country.

9. Occupation.

10. Name of Father.

11. Name of Mother.

12. Birthplace of Father, Town, State or Country.

13. Birthplace of Mother, " " "

14. Duration of Disease.

15. Disease or cause of Death. First or Primary, Secondary (if any.)

Signature and address of attending Physician or other person making the return.

Dated at this day of 187

[Be very particular to fill all blanks.]

\* If other than white.—(A.) African; (M.) Mulatto; (I.) Indian. If other races, specify what.

† If a Married Female or Widow, state of whom she was the Wife or Widow.

The attention of physicians is earnestly invited to the following list of diseases, in reference to which the particulars specified are essential to the *proper classification* of causes of death, and consequently to the *accuracy* and *usefulness* of our statistics of mortality. It is respectfully suggested that a *negative* statement is often as important as positive one—for instance. “Abortion—at two months—Metritis—no cause discoverable.” “Cancer of Stomach—not hereditary, as far as known.” “Erysipelas of Head—not of traumatic origin.” “Gangrene of Leg—no definite cause.” “Metritis—not puerperal.” “Small-pox—patient never vaccinated.” “Ovarian Tumor—no operation, etc.” By secondary is meant the immediate cause of death,—e. g., hemorrhage,—in consumption; phthisis would be the primary hemoptysis the secondary cause of death,—meningitis or congestion of the brain the secondary, cholera infantum the primary, etc.

Abscesses—Location and cause, if any.

† Aneurism—Vessel involved, and mode of death. Whether operation.

\* Abortion and Miscarriage—Cause, mode of death, and period of gestation.

Cerebro-Spinal-Meningitis—Variety, whether probably Zymotic (Cerebro-Spinal Fever), or a simple inflammation.

Childbirth—Circumstance producing death.

Cancer—Variety and seat; whether hereditary or not.

† Calculus—Mode of death; whether after operation, and if so, what one.

Carbuncle—Location.

Congestive Fever—Variety.

Continued Fever—Whether simple continued fever or other variety.

Dentition—Mode of death.

Disease of Heart—Variety. Valves involved, if any.

Dropsy—Variety and cause.

Enteritis and Gastro-Enteritis—Cause if known; whether Diarrhœal or not.

\* Erysipelas—Seat and cause; if Traumatic, how produced.

\* Fractures—Cause and mode of death. (State nature of accident, etc., clearly.)

\* Gangrene—Seat and cause.

Gastric Fever—Whether Remittent, Typhoid, etc., or simple Gastritis.

Gastritis—Whether simple or from a definite cause.

† Hernia—Variety and mode of death; whether any operation.

Insanity—Variety and mode of death.

Intermittent Fever—Variety, as Quotidian, Tertian, etc.

Jaundice—Cause.

Malarial Fever—Variety.

Malignant Pustule—Location and cause; whether probably dependent on contagion or not.

Malformation (Congenital)—Variety.

Metritis—Variety and cause; (whether Puerperal or not.)

Necrosis and Caries—Seat, original cause, and mode of death.

† Ovarian Tumor—Mode of death; whether operation.

Paralysis—Variety and cause.

\* Peritonitis—Variety; whether simple, puerperal, traumatic, etc., and if the last, how produced.

Phlebitis—Cause; seat and variety.

\* Pyæmia—Cause; nature of antecedent injury, if any, and how produced.

\* Premature Birth—Probable cause; fetal age.

Preternatural or Abnormal Birth—Manner of.

Small-pox—How often, and when patient Vaccinated.

Syphilis—Variety, chief location, and mode of death.

\* Tetanus—Whether idiopathic or traumatic. Nature of antecedent injury, if any, and how produced.

† Tumor—Location, variety and mode of death; whether operation.

Ulcers—Nature; chief location and mode of death.

Uræmia—Cause or associate affection. Whether puerperal.

\* Wounds—Cause, variety, seat, and mode of death.

\* Particularize any *Accident or other violent cause* leading to death, and character or injury.

† Specify every *Surgical Operation* with fatal results, and state the disease which necessitated it.

Mention intemperance whenever recognized as having produced or complicated the direct cause of death. Give as many particulars as possible instances of rare diseases, such as hydrophobia, glanders, etc.

## REGISTRATION OF BIRTHS, MARRIAGES, AND DEATHS.

### DIGEST OF LAWS.

It shall be the duty of the State Board of Health to have the general supervision of the State system of registration of births, marriages, and deaths. Said Board shall prepare the necessary methods and forms for obtaining and preserving such records. The Secretary of said Board of Health shall be the Superintendent of Registration of Vital Statistics. [See Public Acts, 1878.]

### BIRTHS.

Every physician or midwife shall, before or during the first week of the month next succeeding such birth, furnish the registrar of the town wherein such birth may have taken place, a certificate properly filled out and signed by such physician or midwife.

### DEATHS.

The physician who shall attend any deceased person, shall, before or during the first week of the month next succeeding such decease, leave with the registrar a certificate of death properly filled and signed.

Every sexton or other person having charge of a cemetery or other place of burial, shall, during the first week of every month, return to the registrar a list of all the interments, disinterments, or removals made by him during the month next preceding, with the dates thereof.

## MARRIAGES.

Every person who shall join any persons in marriage, shall return a certificate to the registrar, properly made out and signed, before or during the first week of the month next succeeding such marriage.

## PENALTIES FOR VIOLATION.

Every person who shall violate any of the provisions relating to the registration of births, marriages, and deaths, shall pay for every offense a fine of ten dollars to the use of the town wherein such offense is committed.

## TOWN BY-LAWS.

Any town or city may enact by-laws not contrary to law more effectually to obtain a perfect registration of births, marriages, and deaths, and the registrar of the town in which such by-laws may be enacted shall execute these provisions under the same oath and penalty as if they were the statute laws of the State.\*

The following instructions have been sent to the registrars by the State Board of Health:

1. To secure prompt returns, every month, of births, marriages, and deaths, as the law directs.

2. To diminish the number of deaths reported as from "cause not stated" or "ill-defined," which form too large a proportion of our returns. If the cause of death be not stated, the reason why it is not stated should be given, and no certificates incomplete in any essential point shall be accepted when possible to secure the facts required by law.

The attention of all concerned in the performance of these duties is urgently requested, and it would seem that the plain statement of the requirements of the law, and the recognized importance in all civilized communities of its prompt and regular observance, would secure its fulfillment, as is indeed generally the case in this State.

The registrars are hereby instructed to institute proceedings against all those who *wilfully neglect or who refuse* to observe the plain requirements of the law. As will be seen, it is the sworn duty of the registrars to execute these laws, and all good and law-abiding citizens are called upon to throw as little embarrassment in the way as possible.

By order State Board of Health,

C. W. CHAMBERLAIN,

*Secretary and Supt. of Vital Statistics.*

A quarterly meeting was held Oct. 16, 1878, present, Drs. Butler, Lindsley, and Chamberlain, and Prof. W. H. Brewer. A telegram was received from Dr. Hubbard, stating that he had been sum-

---

\* In accordance with this law, New Haven, Hartford, and perhaps other towns, have enacted by-laws by which more prompt returns of deaths are secured.

moned as a witness in a trial then pending. Communications were presented from Guilford relating to the typhoid fever prevalent there among the members of the Guilford Battery recently encamped at Niantic. Thirteen out of twenty men were sick, and there had been two deaths. No other cases were known in Guilford, or in others of the militia who had been encamped. Drs. Lindsley and Chamberlain were appointed to investigate the origin of the trouble.

The following letter was read by the secretary:

LAW OFFICE OF JOHN H. GLOVER,  
No. 110 BROADWAY, NEW YORK, Sept. 27, 1878.

*My Dear Sir,*—As owner of a residence and property in the town of Fairfield, Conn., I address you with reference to the drainage of said town. Some years ago the water of a pond in the center of the village was drained by the town authorities into a piece of low ground in the rear of my house. No provision was made for conveying the water from said pond, as well as drainage from other parts of the village running into the same locality, into the Sound. An old creek which in former times was the natural outlet was stopped many years since, the ditches in the low ground between my house and the beach are clogged, and they and a pond back of said beach are in a stagnant condition. A civil engineer whom I employed to examine the matter reports, after a careful survey, that a perfect drainage can be effected by a tide-gate and pipe through the sand into the Sound. A great and increasing number of cases of chills and fever and malarial complaints now prevail in the village and neighborhood. I am induced to write to you in hopes that a remedy may be suggested and enforced by your direction. Please inform me if you, or one of the members of the State Board of Health, could meet me at Fairfield to view the situation. If so, an early day would be advisable. A line addressed to my office in New York, as above, would oblige me, and I would take pleasure in meeting you on such day as might suit your convenience.

Very truly yours,

JOHN H. GLOVER.

C. A. LINDSLEY, M.D.,

*Committee of State Board of Health of Connecticut.*

On motion of Prof. Brewer the secretary was directed to correspond with Mr. Glover, and, if deemed expedient, investigate the alleged evil. It was also voted that upon the authentic report to the secretary of any epidemic or endemic disease requiring investigation, or upon any application from responsible citizens for sanitary work, he be authorized to enter upon such work at once, and if deemed expedient or necessary, to call special meetings of the Board.



The secretary read a monthly sanitary report, as the first of a series of monthly reports to be published in the daily papers. The report was accepted, and the plan approved. These reports were designed to form the basis of a report on epidemic, endemic, and contagious diseases by the secretary, for each annual report.

The following form was adopted.

# STATE OF CONNECTICUT.—RETURN OF A BIRTH.

*To be made to the Registrar within the first week of the month next after the birth.*

I certify, from the best information which I can obtain, that

1. Full name of child,
2. Place of birth,
3. Date of birth,
4. Sex of child,
5. Name of father,
6. Residence of father,
7. Occupation of father,
8. Birthplace of father (town, state or country),
9. Color\* father,
10. Age of father,
11. Maiden name of mother,
12. Birthplace of mother (town, state or country),
13. Age of mother,
14. Color\* of mother,
15. Number of child,
16. Number of children now living,

Remarks. If twins or illegitimate, so state.

Signature of physician or other person making the return.

*Dated at* , *on this* *day of* 187

Make a return for each child in case of twins. If stillborn, state age of foetus.

[Be very particular to fill all blanks.]

---

\* If other than white.—(A.) African; (M.) Mulatto; (I.) Indian. If of other races, specify what.

---

The following books have been presented to the board, or purchased for its use :

Transactions Connecticut State Board of Education. Presented by the secretary, B. G. Northrop. 1871–8.

Transactions New York State Board of Charities, 1871–1878. Presented by the secretary, J. O. Fanning.

Transactions Massachusetts Bureau of Labor Statistics, 1874–

1878 : Census of Massachusetts, 1875. Presented by Carrol D. Wright.

Transactions Massachusetts Board of State Charities—Third to Fifteenth. Presented by F. D. Sanborn.

The Sanitarian, vols. 1-6.

Transactions California State Board of Health, 1st to 6th.

Transactions Michigan State Board of Health, 1877-78.

Reports of Medical Officer of the Privy Council, England—complete set.

Transactions Massachusetts State Board of Health, 1878.

General Statutes and Public Acts of Connecticut.

Hassall on Food and its Adulterations.

Bayles on House-Drainage.

Report of Board of Health of Brooklyn, N. Y., 1875-1876. Presented by J. M. Wyckoop.

Transactions State Board of Health of Wisconsin, 1876-77.

Transactions State Board of Health of Mississippi.

Report of U. S. Marine Hospital Service. J. M. Landers.

Charter and Revised Ordinances, New Haven.

Charter and Revised Ordinances, Bridgeport.

Charter and Revised Ordinances, Norwich.

Annual Reports, Meriden.

Transactions State Board of Health of Louisiana.

Transactions Board of Health of Reading, Pa.

Transactions Board of Health City of Boston.

Transactions State Board of Health of Colorado.

Transactions State Board of Health of Minnesota.

Transactions Board of Health City of New Haven.

Registration Reports City of Providence, R. I., 1874-76.

Rhode Island Registration Reports. Presented by Dr. E. M. Snow.

Blyth's Dictionary of Hygiene.

Cameron's Manual of Hygiene.

McDonald's Microscopical Examinations of Drinking-water.

On the Adulteration of Milk. H. A. Mott.

Studies on the Laws of Life. State Medicine in its Relations to Insanity—The Treatment of the Insane—Claims of the Sick Poor—The Prevention of Insanity. Presented by Dr. Nathan Allen.

Transactions Georgia State Board of Health.

Carpenter's Preventive Medicine.

Transactions Board of Health, District of Columbia.

## TREASURER'S REPORT.

---

### EXPENDITURES TO DECEMBER 1, 1878.

Printing,		\$198.21
Postage,	- - -	49.00
Traveling expenses,	- -	64.56
Stationery,	- - -	19.95
Books,	- - -	30.00
Blanks for Vital Statistics,	- - -	34.75
Salary Secretary one quarter,		250.00
		<hr/>
		\$546.57
Cash on deposit,	-	203.43
		<hr/>
		\$750.00

### RECEIPTS.

By Cash,	\$750.00
----------	----------

Bills outstanding, mainly for Department of Vital Statistics, about \$200.

C. W. CHAMBERLAIN, *Treasurer.*

Examined and approved.

C. A. LINDSLEY, *Auditor.*

---

# STATE PREVENTIVE MEDICINE.

---

THE FIRST ANNUAL ADDRESS

TO THE

## STATE BOARD OF HEALTH

OF CONNECTICUT,

BY JOHN S. BUTLER, M.D.,

LATE PHYSICIAN AND SUPERINTENDENT OF THE CONNECTICUT RETREAT  
FOR THE INSANE, AND HONORARY MEMBER OF THE MEDICO-  
PSYCHOLOGICAL ASSOCIATION OF GREAT BRITAIN.

PRESIDENT OF THE BOARD.

---



“Health is the greatest of all possessions, and it is a maxim with me, that a hale cobbler is a better man than a sick king.—*Bickerstaff*.”

“A change has come over the science of medicine; with true nobleness of purpose, true medicine has been the first to strip herself of all mere pretences to cure, and has stood boldly forward to declare, as a higher philosophy, the prevention of disease. The doctrine of absolute faith in the principle of prevention includes the existence of a higher order of thought, of broad views on life and health, on diseases and their external origin, of death and its correct place in nature. The science of prevention becomes a political and a social, as well as a medical study.”—*Dr. Richardson*.

“We stand now at the very dawn of the grandest epoch yet seen in the progress of medicine. While philosophically, accurately, and with the most minute skill studying by means of physiology, pathological anatomy, chemistry, the microscope, and above all, by careful clinical observation, the natural history of disease and the effects of remedies, our art at the present day looks still higher, viz., to the prevention of as well as to the cure of disease. And this is to be done by sanitary organizations throughout each State, the nation, the laity, and the profession heartily joining hands in this most noble cause. If by such means one-third or more of the sickness and the suffering consequent thereto can be averted; if the rate of mortality can be very sensibly diminished, public health everywhere greatly improved, and human life prolonged, ‘the glorious triumphs’ predicted by Dr. John Forbes, it may truly be said, ‘are being achieved.’” —*Dr. H. I. Bowditch*.

“Power can be generous. If our mechanic arts are unsurpassed in usefulness; if we have taught the river to make shoes and nails and carpets, and the bolt of heaven to write our letters like a Gillott pen, let these wonders work for honest humanity, for the poor, for justice, genius, and the public good. Let us realize that this country, the last found, is the great charity of God to the human race. . . . Humanity asks that government shall not be ashamed to be tender and paternal, but that democratic institutions shall be more thoughtful for the interests of women, for the training of children, and for the welfare of sick and unable persons, and serious care of criminals, than was ever any the best government of the old world.”—*Ralph Waldo Emerson*.



## STATE PREVENTIVE MEDICINE.

---

State Preventive Medicine is the now generally accepted term for what has been known as the science of public health, or hygiene. It has received various definitions; that which gives it the widest signification will best express the province which is now generally assigned to it. Dr. Mapothers, an eminent authority, defines it as "an application of the laws of physiology and general pathology to the maintenance of the health and life of communities by means of those agencies which are in common and constant use." Sander, a recent German writer, gives the definition as "the care the State may reasonably be expected to exercise over the health of the individual by himself, and in his relation to the community." Another, which I think better covers the whole ground, and is in part by Dr. Smith of New York, makes it the power to protect the people from pestilence, whether foreign or domestic; to discover and remove the causes of disease within and around their houses, to promote the general health of communities, and plainly to point out the ultimate relation between their physical condition and their moral and intellectual position. State Boards of Health are the executive officers of State Preventive Medicine—or in other words, the machinery by which its principles are applied to practice.

It is not, as is generally supposed, of modern origin, but dates back to remote antiquity. The Mosaic, the most ancient of all codes, embraces the wisest sanitary laws as a prominent part of those given for the religious guidance of the Jewish people. The remains of the aqueducts, sewers, drains, public baths, and street-pavements of ancient Rome, and the traces left in the ruins of private houses, of appliances for ventilation and drainage, many so thoroughly constructed as still to be in excellent preservation, testify to the recognition of the same laws by the Romans.

The laws of Lycurgus, says Dr. Gairdner, are not wanting in many very pointed enactments on sanitary matters; and the importance attached by all the Greek republics and in the ideal Platonic polity, to physical culture, is well known. Thus the Jews, the Greeks, and the Romans, the most manly of all the races of mankind, owed to the temperance and simplicity of their lives and their obedience to the laws of preventive medicine, that vigor of body and energy and decision of mind which made them so invincible in war, so wise, self-reliant, and progressive in all the arts of peace, and gave them in turn the merited and proud rank of the dominant nation of the world. We learn from the Justinian Code that a corps of State Physicians was early appointed in the Roman Empire; there were ten of them in the largest towns, one to each district or subdivision; seven in towns of the second order, and five in the smaller ones. They collectively formed a college, whose duty it was to attend to the public health.

For centuries after the decadence of the Roman Empire, we trace in the history of the world no recognition of the necessity of any sanitary provision. Pure air and pure water, ventilation and drainage, and all the other essentials to health, seemed unheeded. The monk, holding in his watchful and oftentimes miserly keeping the manuscript records of our holy religion, was almost the only one who cared to clothe the naked, feed the hungry, build hospitals for the sick, and dispense sadly needed charity to the poor and suffering. The preacher of righteousness, he was generally also the illustration of personal filthiness. The causes of disease were unknown, and consequently unchecked; and the frequent and terrible epidemics which often more than decimated the nations, were considered special manifestations of the wrath of God. The history of England or of Europe gives little evidence of any material advance in this department of civilization, until the nineteenth century. Up to this time we find only the repetition of the same sad story of sensuality and apathetic ignorance, of cruel oppression and servile submission, of the absence of all human sympathy, and the measureless waste of human life.

In the advance of civilization, England was the first nation to learn that the penalties for all violation of the physical laws are as inevitable as those of the moral laws; and that all true national progress would be in proportion to the due recognition of each.

The plague, small-pox, fever and ague, on land, the scurvy on ship-board, with other results of the universal neglect of all sanitary care, diminished the national resources and crippled the national strength. She began to realize that pestilence was no more a special visitation of Divine anger than war, and was alike to be anticipated and avoided, or wisely and efficiently met. During the last century something was done in Europe, and more especially in England, to improve the sanitary condition of the larger cities and of the more densely populated manufacturing and agricultural districts. But this, almost the first step in the modern recognition of sanitary science, was tardy and incomplete; its laws were imperfectly understood, and the efforts to apply this scanty knowledge were without intelligent system or efficiency. The epidemic of cholera in Great Britain in the year 1832, in its practical teachings and ultimate results, proved the starting-point of a great advance in hygienic reform. Its distinct and novel selections of certain peculiar localities as the best prepared and fitted for its ravages, its uniformly greater prevalence and fatality among the poor, the degraded, and the filthy, than among those classes where the comforts and the decencies of life were found, its very general avoidance of the latter until it had acquired an accumulated virulence and power by its malignant growth among the former, all united in demonstrating to the government the vital necessity of an immediate and thorough investigation into the causes and possible means of prevention of a pestilence so fatal to national prosperity and life. The right measures were promptly taken. Government commissions were appointed, thorough investigations were made, and the results, carefully and accurately collated, were at once given to the public. The very able and comprehensive governmental report published in 1842 on the sanitary condition of the laboring population of Great Britain, is universally acknowledged to be the true starting-point of modern sanitary legislation. In 1844-6, valuable reports were made by a "Health-of-towns commission," and in 1847-8, reports of a like character by a similar commission. The passage by the British Parliament of the Public Health Act of August 21, 1875, "condensing and amending the previous acts relating to public health in England," is considered by Dr. Bowditch (*our* highest authority) the most important enactment of any nation in modern times.

These reports were the results of the oftentimes imperfectly appreciated or compensated labors of a few earnest men. In this

connection, the names of Mr. Simon, Thomas Chadwick, and Dr. William Farr (the celebrated Registrar-General of Great Britain), have especially become historical. Of the latter gentleman, Dr. Gairdner, himself of the highest authority, writes: "He found the facts of this science in a state of almost hopeless and aimless confusion, and has not only added immensely to their number and value, but has brought into them light, harmony, and order, and for the first time in the history of the science, a determinate method and an approach to scientific exactness; by his system of calculating death-rate, he has given his professional brethren an easy and useful method, and by the formation of life-tables, he has greatly facilitated the operations of life insurance." I quote this tribute to the labors of Dr. Farr, as in the great work before us it will be cheering to know the origin of the pioneer work so helpful to our own present necessities and progress. These details of that efficient combination of individual and legislative instrumentality to which we owe the great advance of sanitary science in Great Britain, as well as the increasing interest in sanitary reform throughout Christendom, will illustrate the important truth, that it is only through this union of the action of the people and the legislature, that these results, so essential to the highest civilization, can be obtained.

On the continent of Europe sanitary science is exciting much interest. The governments of most countries, especially of France, Germany and Italy, are recognizing its national importance by official action. And governmental agency sustained by that of individuals, humane societies, and scientific associations, is giving the best of promise that this great reform, so prominent in its importance, so far-reaching in its aims, so necessary to individual welfare and to national prosperity, is about to be accepted as a vital factor in the progressive civilization of the age. These claims for its high merit will not seem extravagant or unreasonable to those who have studied its obtainable results.

In this country, Massachusetts, as often in other questions of public utility and advancement, took the lead in establishing in 1869 the first State Board of Health in the United States. The history of that board is instructive. In the year 1850, Lemuel Shattuck of Boston, made a report to the legislature of Massachusetts on sanitary reform, which showed singular foresight and wisdom, but was so far in advance of his times, that as Dr. Bowditch remarks, "it fell still-born from the press." It was, how-

ever, good seed, buried, but not dead. Twenty years afterward, through the enthusiastic and untiring efforts of Dr. Bowditch, seconded by the energetic aid of Dr. Jarvis of Dorchester, and the Hon. Thomas F. Plunkett of Pittsfield, and others, the good seed bore this good fruit—the first American State Board of Health.

It is not, I trust, tracing results back to a too remote cause, if I add that Mr. Shattuck's report also gave its inspiration to the first report of the Massachusetts Board; which was from the pen of its first secretary, the late lamented Dr. George Derby of Boston,—a most able and influential document which gave a new impulse to hygienic reform, and still remains a text-book and model for us all. The annual Reports of the Board of Health of this our neighboring State have been continued regularly since 1869. They embrace the results of extensive and careful investigations into the various departments of public health, and like the Privy Council Reports of Great Britain, form an invaluable library of reference for the help of those who are following in the path they have pointed out. The last annual report of the Massachusetts Board (for 1878), contains an important paper upon "Drainage and Health, Sewerage and the Pollution of Streams, including the draft of a Law,"—a document which gives us the result of the examination made upon these subjects by a special commission of scientific and practical men appointed by the governor of the State. This commission spared no needed time, labor, or expense, their investigations were sharp and thorough, they reached every city, and nearly every town in the State; especially every locality where they found any unusual prevalence of sickness, increased death-rate, any suspicion of sanitary neglect, or any complaint of sanitary defect or nuisance. Their report accepted by the Legislature, and sanctioned by the highest legal authorities of the State, must have great weight everywhere, especially in aiding the adjustment of the difficult, embarrassing, and conflicting claims of rights, privileges and long-time uses connected with ponds and watercourses. The increasing density of our population in city and country, and the extension of manufacturing establishments of various kinds, give an increased importance to the question, how far *any* interference with the purity and the domestic uses of water can be considered equitable or legal. The report we refer to, liberally illustrated with maps, plans, sketches, etc., is justly considered exhaustive. The valuable mass of facts and suggestions to be found in the series of reports of the Massachusetts Board is in



that higher line of political economy, which is sure to lead a State to increased power and wealth.

Here, as in England, the most efficient of the pioneers of sanitary reform were not from the active members of the medical profession, but from the laity. What ~~Mr. Simon and~~ Thomas Chadwick have been and happily still ~~are~~<sup>is</sup> to this cause in England, Lemuel Shattuck has been in the United States. Most ably and earnestly have these leaders been seconded by the medical profession in both countries. Thus we see that this is not a subject of limited and exclusive interest, or dependent solely on the aid and sympathy of any class, for its successful inauguration or progress. It is eminently a work for the coöperation of many allied forces; the profession and the laity; the individual and the State. In this alliance alone can success be obtained; in this, it is certain.

We find one of the good signs of the times in the rapid and widespread interest in sanitary reform, which has of late been developed in nearly all parts of the United States. State after State has caught the salutary influence of the example of Massachusetts; leading men, especially in the medical profession, are giving it their active support; the people at large are beginning to recognize the safer, better, and cheaper policy of prevention than of the cure of disease, and to understand that the causes of many of the most dangerous diseases are palpable, easily recognized, and easily avoided.

It remains for Congress to recognize the importance of this subject, and make the "Health Department" a function of the National Government; as it is only through a united and organized system that the best national results are attained.

A Department of Public Health, with a well-defined code of sanitary law, will be established when the people appreciate its far-reaching influences; that both disease and crime come from the same tap-root of pauperism which naturally springs up from the subsoil of filth and unsanitary conditions underlying all, and involving other interests than those simply of physical health. We can see no reason why a public alarm should not be as quickly given for an outbreak of epidemic disease as for an outbreak of fire, and as thorough an organization be provided to meet the one as to combat the other. It is simply the larger application of the common-sense system of prevention. We accept the axiom of military men, that the power of an army is in the health of the soldier, and though the calls for active service are brief, and it is



to be hoped at increasingly long intervals of time, it is the accepted duty of the Secretary of War to keep up the discipline and efficiency of the army at all times. "The fighting time for which a Secretary of Health and his organization would have to prepare is daily and continuously. It would be with him as if an invading enemy were constantly to be met, and every year a great battle was to be fought."\* At the present time civilization is fighting these battles all over the world, and for the most part losing them, as in that unobstructed invasion of Great Britain in 1832, by cholera, which proved so destructive of life and property, and also as, during last summer, yellow fever found free admission to our principal southern port without inspection or quarantine. That fever, once admitted, found in the accumulated filth of city, town, and country, such an abundant material for the reception and development of its poison-germs as to defy all prevention or remedy. The consequent loss of life is counted by thousands, the loss of property by millions of dollars; the desolation of households, the consequent suffering, etc., cannot be measured or counted. Cholera has of late years repeatedly visited the ports of Great Britain, and sanitary regulation has restricted it to the infected vessels. Sanitary science claims that the due enforcement of its laws, thorough, rigid quarantine and other precautions, can prevent the importation of any epidemic disease, or limit its ravages, and thus avert such fearful waste of life and property.

Having given the accepted definitions of the science of State Preventive Medicine, and a brief sketch of its rise and progress, we are brought to the questions, What are the specific duties it prescribes? What loss has been sustained by their neglect? What has it already done? What more does it propose to do? and What are its reasonable possibilities in the future?

We have seen that this science was ancient in its inception, and, though long dormant, has of late begun to obtain due recognition of its momentous importance, ranking among its numerous friends and advocates an increasing number of eminent statesmen, scientists, and philanthropists, and in all civilized countries moreover winning to its cordial support many who, from an honest misapprehension of its character and aim, were for a time indifferent or opposed. It now comes before us, claiming the power to prevent disease, prolong the duration of human life, and, in its ultimate reach, to increase the well-being and happiness of the nations. This it seeks to do

---

\* Dr. Farr.

by giving a higher aim and efficiency to the powers of civilization through the removal or diminution of evils which now deteriorate the race or hinder its progress.

The duties it prescribes are well defined in the succinct language of the Act creating this Board:

“The said State Board of Health shall take cognizance of the interests of health and life among the people of this State; they shall make sanitary investigations and inquire respecting the causes of disease, and especially of epidemics, the sources of mortality, and the effects of localities, employments, conditions, *ingesta*, habits and other circumstances upon the public health; and they shall collect such information in respect to these matters as may be useful in the discharge of their duties, and contribute to the promotion of health and the security of life in this State; they shall cause to be made by their Secretary, or by a Committee of the Board, inspections at such times as they may deem best, and whenever directed by the Governor or the Legislature, of all public hospitals, prisons, asylums, or other public institutions, in regard to the location, drainage, or water supply, disposal of *excreta*, heating and ventilation, and other circumstances in any way affecting the health of their inmates, and shall also suggest such remedies as they may consider suitable for the removal of all conditions detrimental to health.”

These duties are also marked out by Cameron as “mainly to procure supplies of pure water, to prevent the pollution of air and water by foul liquids, gases, vapors, and dirt of all kinds; to prevent over-crowding of dwellings, to see that the houses of the laboring classes are in perfectly tenable order, to check the sale of adulterated, diseased, or otherwise unsound food, to cleanse the streets and roads, to prevent the spread of contagious diseases, to bury the poor, to provide burial places for rich and poor, and to disinfect and to provide dwellings for artisans.” The German code is still more minute and comprehensive.

It is meant furthermore, that the best knowledge bearing upon the illustrations and teachings of this science, and upon the legislative action necessary for its furtherance, shall be published in a plain and economic manner, and be freely distributed throughout the community, in order that the people may be educated in respect to the nature and causation of diseases, the means of prevention, and generally the danger of ignorance, neglect, or disobedience of the laws of hygiene.” This diffusion of

knowledge is truly the first and gravest duty of all; other measures following in due course the right discharge of this primary duty. In the words of an eminent English statesman,\* "No sanitary improvement worth the name will be effective, whatever acts you pass, or whatever powers you confer upon public officers, unless you can create an intelligent interest in the matter among the people at large. The State may issue directions, municipal authorities may execute to the best of their power, inspectors may travel about, medical authorities may draw up reports, but you cannot make a population cleanly or healthy against their will, or without their intelligent coöperation. This is why, of the two, sanitary instruction is even more important than sanitary legislation." At this time, when so many schemes of reform and philanthropy (falsely so-called), are dinned into the public ear, any new claim, urged not only on the people but on the government of the State for adoption and support, should of right be submitted to the sharpest scrutiny, and to the rigid requirement of satisfactory evidence.

Dr. Richardson says : †"I want strongly to enforce that it is the section of the nation which Dr. Farr classes as the domestic—the women—on whom full sanitary light requires first to fall. Health in the home is health everywhere; elsewhere it has no abiding place. I have been brought indeed by experience to the conclusion that the whole future progress of the sanitary movement rests for permanent and executive support on the women of the country. When as a physician I enter a house where there is a contagious disease, I am, of course, primarily impressed by the type of the disease and the age, strength, and condition of the sick person. From the observations made on these points I form a judgment of the possible course and termination of the disease, and at one time I should have thought such observations sufficient. Now I know them to be but partly sufficient. A glance at the appointments and arrangements and managements of the house is now necessary to make perfect the judgment. By this glance is detected what aid the physician may expect in keeping the sick in a condition most favorable for escape from death; and by this is also detected what are the chances that the affection will be confined to

---

\* Lord Derby.

† Address on the "Future of Sanitary Science," before the Sanitary Institute of Great Britain, July, 1877.

one sufferer or distributed to many. As a rule to which there are the rarest exceptions, the character of the judgment is hereupon dependent on the character of the presiding genius of the home, on the woman who rules over that small domain. The men of the house come and go; know little of the ins and outs of anything domestic; are guided by what they are told, and are practically of no assistance whatever. The women are conversant with every nook of the dwelling, from basement to roof; and on their knowledge, wisdom, and skill the physician rests his hopes. How important, then, how vital that they shall learn, as a part of their earliest duties, the choicest sanitary code."

As a timely illustration of the correctness of this judgment, I may be permitted to state, on the authority of Dr. Bowditch of Boston, that the movement which resulted in the establishment in Massachusetts of the first Board of Health in the United States, originated with a lady of Pittsfield, (Mrs. Thomas F. Plunkett,) who had been intimately connected with the Maplewood Seminary in that town at the time of the well-known outbreak of typhoid fever in that institution, and was an intelligent observer of those violations of sanitary law which led to such disastrous and fatal results.

In fairly measuring what sanitary science has done and can do for the people, we are to take into consideration all those powers, values, and indeed sympathies, which are the real vital elements of the State, and which must exist in due proportion to make the best whole. We are also to take the right estimate of another element of public or State property, whose full measure of worth political economists have only of late been ready to admit, the money value of each healthy life, acknowledging the soundness of that axiom of finance as well as of political economy, that public health is public wealth.

In their best conditions, air, water, food, clothing, house construction, drainage, and more indirectly soil and climate, each with individual importance and mutual relation, are positive factors of the best health assurance. This is demonstrated by that which is the ultimate standard and measurement of sanitary results,—the diminished death-rate, that diminution being in due proportion to those best conditions. In further illustration of these measurements, let us compare the sanitary condition of the people of England in the last century with that of the present time; the utter neglect, then, of drainage, sewerage, and ventilation, of purity and plenty of air

and water, of personal cleanliness, of the removal of filth accumulations, with badly-constructed dwellings, poor and insufficient food and clothing, all leading to their natural results in the frequent recurrence of zymotic (epidemic and contagious) diseases, and the unrestrained prevalence of all other forms, with a corresponding death-rate of about 1 in 23, against about 1 in 40 at the present time; the death-rate being at all times the most reliable flood-mark of diseased conditions.

To-day, by the establishment of government boards, and the employment of able and learned men as the inspectors, "full," as Dr. Bowditch says, "of the enthusiasm and accuracy of modern science, England has made an immense stride towards having a perfect system of sanitary guardianship of the realm." The reports of her unrivalled system of statistical investigations enable us to measure with a good degree of precision what State Preventive Medicine has already accomplished there. In all the conditions above specified, especially in regard to the removal of filth, as in the recognition of the fact that the germs of vice, as well as of disease, are developed from filth, extraordinary advances have been made. Epidemics and contagious diseases have either been prevented or kept within narrow limits; some diseases have disappeared, and the frequency and fatality of others have been largely diminished. Consequently the general death-rate has fallen to a much lower figure. Of course, these conditions are not universally regarded; in many locations are found overcrowded dwellings, an abundance of filth and vice, and the neglect or defiance of all sanitary law, and consequently in such places there is no diminution, but an increase of sickness and of the death-rate,—the difference in the latter between the most healthy district and the least in the same city, varying sometimes from twelve to fifty or even sixty in 1,000. Mr. Chadwick\* says: "We have gained the power of reducing the sickness and death-rate of the old cities by one-third; . . . of the death-rate in the old settled country districts to 16 or 17 in 1,000; . . . in the new districts, with complete systems of water-supply, drainage, etc., to less than one-half, or a mean rate of 10 to 1,000, and of sickness in due proportion in both; . . . in prisons and other places under sanitary control, and in the large collection of indigent and dependent children in schools and insti-

---

\* Paper read before the British Social Science Association in 1877, on the chief results of the progress of Sanitation.



tutions, to 3 in 1,000, or one-third of the death-rate prevalent among the general population of the same ages, while fully one-half of the diseases of the pulmonary organs in the general population may be prevented by public sanitation." Mr. Chadwick also enumerates many other points of gain and advancement. The result of these national reforms is an equal advance in the material, financial, physical, and moral power of the whole kingdom; a striking illustration of the correctness of the accepted axiom that the health of the people is the first object of good government.

We have thus dwelt upon what has been accomplished in England, as the admirable reports of the British Parliament are unrivalled in their thoroughness and fullness of detail, as well as soundness of conclusion, and are our best instructors and guides. But sanitary reform embraces a wider field; it has availed itself of the researches of science to teach us the quantities and the qualities of air demanded by the best sanitary conditions; its impurities, their sources, and the means of their detection and avoidance, as in proper heating and ventilation, and the intimate relation of these deficiencies and deteriorations to various diseases, especially in the necessities of tenement-houses, prisons, mines, schools, the rooms of the sick and the poor, the workshops of the various trades, and all places where any impediment exists to the free circulation of pure and dry air, as in rooms occupied by many, or by laboring or diseased persons.

As an illustration of these positions, Dr. Carpenter has shown that the fatality in the well-known Black Hole in Calcutta, in the prisons in which the Austrians were confined after the battle of Austerlitz, and in other well-known instances, were not caused, as has been generally supposed, by the excessive generation of carbonic acid gas, but by the "poisonous agency of the organic matter always found in air rendered fetid by the prolonged respiration and cutaneous exhalations of a crowd of human beings, and by the deficiency of the oxidation, and the consequent increase of putrescent matter in the body." It has been shown that consumption often has its origin not only from continuous exposure to dampness of the air, but also from air rendered impure by other, even healthy, persons occupying the same close or unventilated room, or what is still more dangerous, sleeping in the same bed or bedroom with a consumptive patient; for it is admitted that the air of a close and crowded room may be as effectually poisoned by



the prolonged respiration and cutaneous exhalations even of persons in good health, as by the introduction of sewer-gas.

The specific poisons (whatever may be their ultimate form) of small-pox, typhus and scarlet fever, measles, and diphtheria, yellow fever, etc., pass off into the air and are thus diffused and communicated. Dr. Parkes, speaking of the organic substances floating in the atmosphere, and giving rise to a large class of diseases, says "that it remains to be decided in what exact condition this organic matter exists, whether it is always contained in the substances discharged or thrown from the body as in small-pox, or is produced by putrefactive changes in these discharges, as is supposed to be the case in cholera and dysentery. . . This much is known, that they differ in the readiness in which they are rendered harmless. While typhus and Oriental plague throw off a poison which, if there is due ventilation, is readily destroyed, the poison of small-pox and scarlatina, spreads in defiance of free ventilation, and retain their virulence for months." It is accepted that the air fouled by these germs of disease is the agent of their communication. The researches of science have also taught us that the water-supply demands equally careful scrutiny in regard to its purity and the abundance of its sources, whether from rain-falls, rivers, springs, or wells; the limit within which organic matters may safely be held in solution; the character of the matters thus held; the quantities necessary to be supplied for various domestic uses, cleanliness and sewerage; impurities and their origin, and the increasing danger of the pollution of any source of water supply by the filth from privies, sink-drains, cesspools, barnyards, leaky sewers, slaughter-houses, and especially of rivers and ponds from direct sewer openings, and the deposit therein of poisonous, noxious, or polluting refuse from many manufacturing establishments.

It has been proved that any continued poisonous agency in a dwelling-house, for instance an amount of sewer-gas so small as not to be perceptible to the ordinary sense of smell, or the use of well water poisoned by infiltrations from neighboring sinks, drains, privies, cesspools, sewers, etc., in so small a degree as not to affect its taste or relish, or apparent purity, may acquire such an accumulative power as ultimately to produce deleterious or even fatal effects, especially upon children and delicate or susceptible adults.

Another most important hygienic advance is the cognizance of the sanitary as well as moral evil influence of badly-constructed

tenement and other dwelling-houses of those classes whose poverty compels them to seek the lowest rate of rent. Chambers says "that there can be no doubt that the frequency and fatality of epidemics of the middle ages were in a great measure due to unhealthy habitations; the houses were often closely packed in crowded streets, and were often built for the purposes of defense and at a sacrifice of ventilation, drainage, and light. At the present time, with all our boasted civilization, the dwellings of the poor, in our large cities, towns, and villages, are too often a disgrace to humanity." Both in this country and in England, benevolent individuals (as well as some landlords with a view to safer investment), have of late erected dwelling-houses for the poor in which the hygienic conditions of ventilation and drainage, air, water, and space, with all possible *sunlight*, dryness, and consequent cleanliness, are made to combine with rigid regulations, low rents, and unvarying promptness of payment. It is cheering to hear that an extension of this scheme is under the united consideration of wise and benevolent capitalists, and some of our most intelligent architects. It is claimed that the poor can be provided with sanitary habitations at no higher rent than they are now compelled to pay for garrets and cellars. The problem to be worked out is to construct dwelling-houses containing the best combination of domestic necessities, security of physical and moral health, cheapness of rent, and soundness of investment.

New light is also being thrown continually upon the relation between disease and other agencies, such as those of soil and climate, in the direct and marked effect of dampness and low and circumscribed localities, especially in the development of consumption, and of the cutting down of forests and belts of trees, and the breaking up or change of the surface of the ground, in the prevalence of malarial epidemics. The recent literature of the science is full of illustrations of the newly-discovered power of these, and of many other large, though less influential agencies.

It is evident that to measure aright what State preventive medicine has already effected, we must add to the money value of the lives which the accurately measured death-rate proves to have been saved by its agency, the amount saved by the diminution of expense of sickness, and that gained by the relief from suffering, and the prolongation of a healthy life, provided we can find any due exponents to express such values. When we thus review what sanitary science has already done in the better instruction of

the people, as to the causes and the often easy means of prevention of disease in general, and especially of the national calamities of epidemics, in the decrease of sickness and its cost in money and suffering, and in a large diminution of the general death-rate, we may well be surprised at the opposition it has ever had to encounter. We look forward to the greater work it has yet to perfect, and fear that the general acceptance of its teachings, which is sure by and by to come, will demand, as in the past, the needless but terrible lessons of such epidemic visitations as the plague, cholera, yellow fever, small-pox, typhoid fever, scarlatina, diphtheria, diarrhœa, dysentery, and also the various forms of cattle-disease, to teach us by loss and affliction, that sanitary reform, in its medical, legal, and economic affinities, is as nearly allied to Christian duty as to political economy. We shall learn that it is no greater violation of the law of God to permit open-faced vice and crime to degrade the moral sense of a neighborhood than to suffer an undrained and ill-ventilated, densely and foully crowded tenement-house to propagate disease among its inmates; that the laws of heredity are not limited to the continuance of physical disorders alone, but that pauperism in the parents as naturally leads to vice and crime in the children as to disease; that moral and physical evils are alike transmissible, and may and do pass down by a well-known law of inheritance from generation to generation.

The term "State preventive medicine," in its right sense, has a wider range than is generally accepted. It is by no means limited simply to the relation of filth to disease. Ruskin founds the strongest arguments in its favor upon the axiom, that "whatever increases the length of life, increases public wealth; whatever improves health, improves morals." The moral, intellectual, and physical natures of man are of near kindred, and of mutual dependence; the ebb or flow of each alike moves the other. Especially is this seen in the connection between the sanitary condition and that trinity of evil sequences,—pauperism, vice, and crime. This relationship, in its far-reaching results, is to-day the gravest and most difficult question before the friends of good government and social progress.

I accept the distinction between honest poverty and pauperism. "The poor we have with us always," and Christian charity accepts the implied obligation in behalf of those who need our aid rather through misfortune than through their own fault. Pauperism is in chronic alliance with indolence and vice. Filth, prolific as it is

of evil, yields the place of preëminence to pauperism; for, in some of the older cities of Europe, filth, in some quarters, appears to be almost the normal condition, without the seemingly inevitable sequence of epidemic disease.

When the Commonwealth charged this Board to take cognizance of the best interests of the health and life of its citizens, it simply expressed a broader recognition of that accepted duty which has heretofore led it to pass and enforce laws for the protection and advancement of their moral, intellectual, and material benefit, as now for their physical. It wisely establishes and supports a system of public education, indorses the departments of police and fire, regulates the movements on our railroads and highways, and, in short, reaches out its paternal carefulness (though not always in the highest wisdom) in a multitude of ways; but while doing all this, it suffers our streams and water-supplies to be polluted, does not compel vaccination, and suffers children and others from families infected with diphtheria, scarlet fever, and other contagious diseases, to enter our public conveyances, churches, schools, and social meetings, without hindrance, ignoring the fact that the infinitesimal germs of disease may be communicated, not only by contact with a diseased person, but conveyed by the clothing, and retained by the furniture of the sick-room; and tolerates, in the very heart of our cities, open sewers with obstructed flow, whose consequent settlement and putrefaction give rise to deadly miasms! In brief, we suffer pestilence to contaminate the air we breathe, and the water we drink; to walk our streets and enter our dwellings not in darkness only, but at noonday, and this without fear or protest; while we make careful provision for the alarm of the locomotive whistle and the fire-bell!\*

The prevention of indiscriminate charity also has to do with the science whose vital importance I am urging. Alms-giving at the door, in the street, or elsewhere without accurate knowledge or concerted action, is a prolific source of pauperism and crime. ✓It discourages honesty and industry, and offers a premium to indo-

---

\* A recent act of Parliament gives the largest cities of Great Britain power to take possession of unhealthy localities and dwellings, etc., to insure sanitary conditions. It is high time that every large town and city should have the legal power to protect the health and business of its citizens, not only by the abolition of those plague-spots so often found where disease as well as pauperism, vice, and crime are freely generated, but by the isolation or quarantine of contagious diseases.

lence and vice. It multiplies the already large and formidable array of beggars who are at war with work and wages, and feeds a host of vagrant children suffered to be destitute of the educational, moral, and religious influences of healthy homes, leaving them to the successful training of the squad-drill of the street for the higher grades of evil doing—the boy for bolder violations of law, the girl too often to recruit the ever open ranks of prostitution, that social evil whose revenges though secret are no less terrible, reaching as they sometimes do, to the “third and fourth generation.” Another example is the tramp whose outrages upon the person and property, some of which through the fear and shame of the sufferer are never proclaimed, have made the revolver almost a family necessity in many outlying and thinly peopled districts.

In this connection, and alike pressing upon us, come the grave questions regarding the sale of the ballot, the safe working of free suffrage, the equitable adjustment of the rights of labor and capital, and communism, which is well defined as the political expression of irreligion, and it may be added, of uncompromising hostility to republican government, for it is evident that the fires of the Tuilleries and Pittsburg depot were lighted by the same torch and have the same signification. [All these forces of social and political disturbance unite to foster antagonism of classes, and to destroy the natural kindly sympathy and the duly recognized dependence between the rich and the poor, the consumer and the producer. Communism does not originate from unsanitary, but from far deeper and more perilous conditions; yet it finds its recruits and most reckless supporters where sanitary reform is most needed.] Many political economists, apparently wise and far-seeing, are of the opinion, that we may more safely ignore fire, pestilence, or even war, than these combinations in their far-reaching and disastrous results. Thus we see that state preventive medicine is neither a professional hobby used to carry out some theory of local and doubtful utility, or to advance any narrow personal ambition, nor is it a universal panacea by which all the evils of our social system are to be remedied. It seeks the common-sense application of scientific and practical knowledge to the prevention or removal of evils needlessly yet really growing out of an advanced civilization with increased density of population, diminished simplicity of living, larger factitious wants, and undue excitements. It is in these



conditions evidently that the gravest problems of the coming years are involved.

The history of some of the most destructive of the Zymotic diseases strikingly illustrates the demands of preventive medicine.

Leprosy was so prevalent in England during the middle ages as to require a hundred regularly established Leper-Houses for its isolation. This loathsome disease is now to be met with in many countries, and its extension is only prevented by its rigid seclusion.

Scurvy is another of the destructive diseases of early times; it comes from privations and poor food, and has prevailed in armies, besieged cities, and especially on ship-board. Its ravages in former times "were most appalling, and it is estimated that more seamen perished from scurvy than from all other causes combined, whether sickness, battle, or tempest." It is said that in one year 10,000 sailors, in the navies of Great Britain, perished from this cause. Good food, vegetables, fruits, and especially vegetable acids, were found to be absolute preventives. It has, of late, again appeared, not only in the English merchant service, but on board one of the Northern discovery ships, from the culpable neglect to provide a sufficiency of these simple but effectual remedies.

The plague, a malignant kind of contagious fever, well termed one of the great historic scourges of mankind, has again appeared in Europe. This disease, historians estimate, has destroyed, during the past centuries, over 25,000,000 of human beings. It is supposed to have originated in China; under the name of the Black Death it spread through Asia and Europe in the 14th century, and invaded England in 1663-5. As late as 1720 it destroyed half the population of Marseilles, and about 1790 prevailed extensively in Russia and Poland. In 1665 the Great Plague, so graphically described by De Foe, destroyed nearly 80,000 people in London; there, as elsewhere, its ravages were unchecked; its progress was marked only by the sign of the Red Cross, and the inscription, "Lord have mercy upon us," over the doors of the infected houses, and by the cry, "bring out your dead," as the carts went from street to street collecting the death-toll of this fearful pestilence. Like a fire on the prairie, it died out for want of material to feed upon. Sanitary precautions were unknown. Its recent invasion of Europe comes naturally in the train of the privations and sufferings of war. Unknown and unlooked for by the ignorant local authorities, its first developments were unheeded. As soon



as it was recognized, the Russian government applied energetic sanitary treatment. Scientific health-commissions with plenary powers were created, rigid inspection and quarantines were established and enforced by a cordon of troops, and infected houses and their contents were burned. Austria, Germany, France, and England have taken the alarm, and consequently all the allied forces of State preventive medicine are being arrayed against the progress of this most formidable enemy. The contrast between the passive and ignorant surrender of the olden times, and the efficient and intelligent opposition now made, is a striking illustration of the progress of Sanitary Science.

Edwin Chadwick, Esq., of London, in his address before the International Congress of Hygiene of Paris in August, 1878, says:—"At the Congress of Hygiene at Brussels, a paper was given by Professor Zidekauer, consulting physician to the Emperor of Russia, in which he compares the results of the old medical treatment used in St. Petersburg during the three successive attacks of cholera in 1836, 1848, and 1855, with our system of dealing with the premonitory symptoms which they carried out closely and satisfactorily in 1866. In the first three attacks there were not less than from 47,000 to 50,000 individuals struck with cholera, of whom not less than from 23,000 to 25,000 died, that is to say, fifty per cent. In the epidemic of 1866, from 57,000 to 60,000 inhabitants were affected with premonitory symptoms, who received immediate relief; but only 15,000 had developed cases, of whom only 3,000, or about five per cent. died. This I submit as a fair result of our system."

Small-pox is well characterized as the most loathsome and destructive pestilence that ever existed, its victims being a hundred to one that perished by the plague. For years preceding the discovery of vaccination its victims were estimated at not less than 500,000 annually in Europe alone, with one-half its present population, and those it did not kill were often deformed. Vaccination has added three years to the general average of human life all over the world, and when duly enforced, and with the use of purely bovine matter, and with due seclusion and restriction of imported or sporadic cases, this disgusting disease can be as effectually extirpated from the civilized world as scurvy or leprosy. Yet by the neglect of vaccination, isolation, and all due sanitary measures of prevention, no less than 51,034 died in Great

Britain from small-pox in the ten years 1856-1865, and in the year 1864 alone the deaths were 9,425.\*

In a paper read before the American Public Health Association in 1876, Dr. Lee of Philadelphia, gives an approximate estimation of the loss sustained by the city of Philadelphia from the presence of small-pox in the winter of 1871-2. This includes the loss by diminution of travel and traffic of railways, etc., in and out of the city, loss to inn-keepers, retail dealers, merchants, manufacturers, travelers, customers, shipping interest, laborers, etc.; adding to this the value of the loss of life, loss of labor, and cost of sickness in the 25,000 cases of disease. He makes the tax thus imposed upon the city of Philadelphia to amount to not less than \$24,000,000.

In 1871-72, through similar violation of sanitary law, small-pox prevailed as an epidemic in Boston and Lowell. Over a thousand lives were heedlessly sacrificed, besides the corresponding money-loss.

In these and all preceding estimates, no attempt is made to measure the consequent suffering and burden of orphanage and widowhood.

Insanity is strictly a physical disease, and comes eminently within the range of preventive medicine. When our proposed system of State sanitary registration and report is carried out, and each case is reported in its earlier stages, we may hope to obtain a more accurate knowledge of the predisposing and exciting causes of this flood of mental disorder which is filling our lunatic hospitals faster than we can or do build them. We can also more efficiently apply the means of prevention and remedy, when we can better measure its varied pernicious causes of erroneous educational and social influences, neglect of family training to reverence and obedience, sensational reading, evil habits of body and mind, idle, aimless, or sensual life, and learn more exactly as we shall surely learn, how very early in life the predisposing causes of insanity are planted in the child. In view of the relation of insanity to general hygiene I may here present the proposition that as the healthy brain-cell is to the best mental action, so is the right sanitary home to the highest physical social life. In no department of philanthropy and science during this 19th century, has greater progress been made than in the direction of the better care and treatment of the

---

\* Chambers' Cyclopedia.

insane. Their condition in the last century is well described by a quaint old Scotch writer who says, "the better sort of ye mad people we leave to the care of the Chirurgeon, the baser sort to the taming of the scourge." Fifty years ago only half a dozen lunatic hospitals, and all of limited capacity, existed in the United States. To-day there are over eighty with most liberal provision for their 30,000 inmates. A greater work remains to be done, a work greater than cure or kindly care—that of prevention; a work which in order to be of the highest success, must reach back often to the early life, the family, the school, and the nursery.

The question before us to-day is, not only what can the State do for the chronic insane; but the wider and more timely question, how can we prevent insanity?

In my report for the Retreat for the Insane for 1860, I said . "Over three thousand cases of insanity have now come under my direct observation and care. In a large proportion of those whose histories I could obtain, I have found that the remote and predisposing causes of insanity could be traced to malign influences on childhood." The neglect of physical training, and the imperfect physical development which follows from this neglect, are strikingly evident in many of our female patients. The various causes which are reported to me as the sources of disease, and which are classified in the tables under the head of "ill health," "undue mental effort," "grief," "domestic unhappiness," etc., may very frequently be traced, in their primary influences, to the one cause of a want of physical stamina. We press the training of the mind, by all possible hours of study in and out of school, and by the added stimulus of emulation, while we neglect the training of the body, in disregard of that mysterious but absolute law of sympathy, which compels the debility of the latter to cripple the action of the former. My own observation leads me to think this error will be found to exist more frequently with the parents than with the more intelligent and advanced of our teachers; and its pernicious tendencies are beginning to be better appreciated. "I venture to say that not one girl in ten, now-a-days, enjoys really sound, rugged health; and surely that is a very unwelcome statement about those who are expected hereafter to be helpmates to husbands and mothers of children. . . . Parents and teachers both, should inculcate upon children of both sexes, the importance of health-bringing, active exercise. Boys need but little urgency,

but girls should be compelled to take it. *It is possible* for them to become of strong, vigorous health, with excellent digestion, and no nervousness.\* ”

In my report of 1840, I stated that of the female patients admitted during the past three years, thirty-four per cent. were the wives of farmers and mechanics—an undue proportion of the comparative number of these classes in the community. The consideration of the causes which led to this most natural result, showed that between child-bearing, nursing, the accumulation of household duties and drudgery, and the miserable short-sighted economy which often led the husband to refrain from supplying the necessary domestic assistance, the poor discouraged wife lost in turn her appetite, her sleep, and her strength; her nervous system had become prostrated, and, sinking under her burdens, she had sought refuge in the Retreat. One of our worthy female patients remarked one day to a lady, “Only think of it! they are keeping me here, and I have six children and fourteen cows to take care of at home.” “Twenty excellent reasons for your remaining here until you are cured,” was the timely answer. They were the twenty reasons which had made her insane. Certain it is, that a decided majority of all the cases of insanity which have come under my care during the past forty years, have arisen from easily-avoidable causes, and might therefore have been as easily prevented.

The laws of heredity are not limited simply to the transmission of disease; drunkenness, idleness, pauperism, vice, crime, come under the same laws, and may be alike propagated from parent to child; and by a well known law of sympathy, each one of these often draws one or most of the others in its train of consequences, all leading directly to the deterioration of the race.

On the other hand, and in direct opposition to this result, we find that the sanitary law of prevention which enforces the removal of those causes of loss, evolves the healthy body and healthy mind, and that marvelous power of the will over not only the insane impulse but over all those other disordered impulses which come from deficient self-control. Up to the acceptance of this law, and to the obedience of its requirements, the people must be educated;

---

\* Gen. Oliver's Report to the Massachusetts Board of Education.

thus making the necessary education of the race the successful antagonist of its deterioration. This is the application of the well-known Oriental legend, of the contention between Ebony and Topaz—the evil and good Genii—for the soul of the young Prince.

So long as we allow unsanitary conditions within and about dwelling-houses, so to dwarf the physical as well as the mental and moral power of the child as to prevent the best development of adults; so long as we suffer diphtheria, scarlet fever, etc., to kill the child, consumption the young man and woman, typhoid the working-man, and other alike preventable diseases to do their evil work upon the ignorantly exposed sufferer; so long as we keep the death-rate as (ignorantly or not) we do keep it, above the possible 15 or even 17 to the 1,000, then is our professed Christian civilization deplorably incomplete, and our individual duty as Christian men and women far short of the demands of the second great commandment of the Divine Law.

Dr. Farr says that civilization is to man what domestication is to the inferior animal, and that both "history and analogy justify us in believing that the higher race admits of development by some of the same means found efficacious in the lower." In man, this is accomplished by a hygienic regimen, complete from infancy and in successive generations, and consequently a gradually increasing development in each, but with a geometrical progression and ultimate attainment which, if immediate, would be wonderful.

In the solution of these hygienic problems, it is sought as far as possible to free the people, for example, from those especial enemies of the human race—hereditary disease, hereditary pauperism, and hereditary criminality; to make Consumption, the Tramp, and the Jukes family (fair exponents of these three preventable evils). no longer, as at present, the natural entail of existing circumstances; to develop in the masses, beginning with the children, not only the moral, religious, and intellectual elements, but especially that athletic power upon which alone the best whole can be built, and which in an age when all educational means were at the lowest ebb gave the world the most splendid specimens of manliness. To accomplish the great revolution in society imperfectly outlined in these pages, we must have the aid of a higher power than those simply of interested association and organization. In the solution, therefore, of this vital problem of the future of the race, and



its nearer approach to the possible ideal revealed to us, there is a Divine factor, without whose help all our work will be in vain, but to whose promises, fulfilled in the past and awaiting our acceptance in the future, we may safely look for all needed help in the coming battle for the right before us.

The statistical investigations, especially of the English Parliamentary Commissions, have been made with such care and thoroughness that their results are universally accepted as very close approximations to the exact relations between health and disease. Some of these may well claim our gravest attention:—

It is shown that in London, which is known to be one of the healthiest cities in the world, there is annually an excess of 20,000 deaths, and, in the United Kingdom, of not less than 120,000 deaths, all from causes clearly ascertained to be preventable, and that the serious cases of sickness as clearly preventable are more than ten-fold that number!

Considered as the producers of profit, men are really investments of capital, and as health is the capital of the laboring man, consequently every day of disabling sickness, and every death, is a money-loss. Dr. Farr, in the Report of the Registrar-General, says "that the minimum value of the population of the United Kingdom, men, women, and children, is, upon an average, not less than £159 (\$795) a head. That is the inherent value of them as a productive money-earning race," thus making the loss caused by the 120,000 preventable deaths to amount annually to £19,000,000 (or \$95,000,000). It is also demonstrated that, in addition to the fearful infantile mortality both in city and country, especially in the former, there is annually a preventable excess of 50,000 deaths, in England and Wales, during the school period of life!

In considering sickness as a most important element of loss, we must again look to the English Parliamentary Papers. In Great Britain there are many organizations under various forms and names, as "Benefit Club," "Friendly Societies," etc., which are practically Health Insurance Companies, embracing many hundreds of thousands of members of all ages. These Societies sustain themselves and make certain weekly payments to their sick and disabled members, by weekly or monthly contributions from each member. The accounts of their Treasurers take note of the time, duration, and character of each case, and thus a "full record is made of all the sickness and injuries of a very large portion of the men,



women, and children in every part and in all the employments of the Kingdom." Dr. Jarvis states that "the government, wishing to measure the productive power of the people, gathered these records, made through many years, and placed them in the hands of the best investigators and calculators to analyze and combine them, and to show the proportion and amount of sickness that fell on male and female children and adults of every age, and in the various occupations and conditions of society. These data thus carefully and accurately gathered, showed that for every death there were two persons constantly sick; that is, for every death there were  $730$  ( $365 \times 2$ ) days of sickness and disability."\*

The same close observations and calculations will give, also, the average value of the product and labor of each individual for the day and year. The loss by each death being given, that of each day of sickness or disability can be very nearly approached, and it is one-third of all these losses that Sanitary Science claims to have demonstrated its power to save.

Life has been compared to a line between two points—that of birth, the point of origin, that of death, the point of termination—the length of the line between being an uncertain quantity under a secret and inexorable law, over which we were ignorantly supposed to have little or no control. The history of the human race has ever testified to the incessant craving of the heart that "our days may be prolonged in the land." The Science of Preventive Medicine justifies this innate desire by demonstrating that it possesses the power to give a longer extension and a more definite and certain quantity to this line of life. We are told that "the days of our years are three score years and ten," and if we are deprived of the "residue of our years,"

---

\* As the nation's wealth consists of the sums of all the estates within its border, the great and the small, deducting all incumbrances, mortgages, debts, etc., so the strength of the State is the sum of all the effective people, deducting all the personal incumbrances—sicknesses, disabilities, and imperfections. . . All additions to the physical, moral, or intellectual power of individuals are additions to the energy and productive force and wisdom of the State; and, on the contrary, all deductions from these forces, whether of body or of mind; every sickness, every injury or disability, every impairment of energy, every clouding of the brain from intoxication, etc., take so much from the force of the body-politic. Collective personal gain is public gain, and aggregate personal loss is to the same extent the suffering of the community.—*Dr. Jarvis on Political Economy of Health.*

and do so generally fall far short of that attainment, it will be well for us more carefully to regard that wonderfully-true and perfect sanitary code given to the Jewish nation and recorded for our instruction and guidance in the Holy Scriptures, and remember that through their obedience to those hygienic laws, "He increased the people greatly, and made them stronger than their enemies," and when He brought them forth out of the land of Egypt, "there was not *one* feeble person among their tribes."

Mr. Edwin Chadwick, in his Address on Health, before the British Science Association, 1877, gives a summary of the chief results obtained in the progress of sanitation in Great Britain; and I can do no better than to quote what is especially applicable to our present needs. He says:

1. That we have gained the power of reducing the sickness and death-rates in most old cities by at least one-third; or, as a rule, of reducing the death-rates in old British urban districts to 16 or 17 in 1,000.

2. That in new districts, on sites apart from old urban sites, we may, with a complete arterial system of water-supply and surface-cleansing—including measures for the prevention of overcrowding—insure reduction of death-rates to less than one-half, or to a mean rate of 10 to 1,000, and the sickness in like proportion.

3. That in well provided and well regulated institutions for children from three to fifteen years of age, we may secure them an immunity from the common children's epidemics, and reduce the death-rates to a mean of 3 in 1,000, or to less by two-thirds of the death-rates prevalent among children of those ages in the general population.

4. That in prisons and places under effective sanitary control, the death-rates (from disease) have been reduced amongst persons from the school ages and upwards to about 3 in 1,000, or to one-third of the death-rates prevalent amongst the general population of the same ages.

5. That to the persons in such institutions immunity may be given as against all ordinary epidemics, typhus, and the eruptive diseases, diarrhœa, and dysentery, which ravage the general population.

6. That amongst the general population, a reduction by full one-half of the diseases of the respiratory organs may be effected by general public sanitation.

He says also that the possibility of all this admits of more abundant proof than he has been able to present in that address; that what has been done has been under conditions that admit of more complete and efficient repetition; and adds, it fully justifies the following recent and most important declaration of the Prime Minister of Great Britain, made in a public address in June, 1877: "I have touched upon the health of the people, and I know there are many who look upon that as an amiable but merely philanthropic subject to dwell upon; but the truth is, that the question is much deeper than it appears upon the surface. The health of the people is really the foundation upon which all their happiness and their power as a state depend. It is quite possible for a kingdom to be inhabited by an able, active population; you may have skillful manufacturers, and you may have a productive agriculture; the arts may flourish, architecture may cover your land with temples and palaces; you may have even material power to defend and support all these acquisitions; you may have arms of precision, and fleets of torpedoes; but if the population of that country is stationary or yearly diminishing; if, while it diminishes in number, it diminishes also in stature and strength, that country is ultimately doomed. And, speaking to those who, I hope, are not ashamed to say that they are proud of the empire to which they belong, and which their ancestors created, I recommend to them by all the means in their power to assist the movement that is now prevalent in the country, for improving the condition of the people by ameliorating the dwellings in which they live. The health of the people is, in my opinion, therefore, the first duty of a statesman."

Mr. Chadwick adds: "Sanitary science has had for its first stage simple ignorance and apathy; next, its stage of empiricism and half-knowledge, in which stage it is very much at present; with the common result of expensive, misfitting, inefficient, and wasteful work; with water distribution which makes good supplies bad, and bad supplies worse; with water carried into houses without the means of removing fouled and waste water, aggravating the evils of damp and of excrement-sodden sites; sewers without adjustment to the house drains; intended arteries without relation to the capillaries of the system, leaving undiminished death-rates, serving to encourage the sinister objection that sanitation is of no avail; and lastly, it has the stage of science, of complete knowledge, of unity, efficiency, and economy, tested by reduced death-rates."

We may well have most sanguine hopes of the future when we reflect that sanitary reform practically is a question of not a quarter of a century old; that the earnest and widespread thoughtfulness upon its necessity and value is far more than a temporary excitement; and as an eminent sanitarian has said, that during this last period, short as it is, more practical work has been done to crush out and prevent disease, and more valuable papers written illustrative of public hygiene, the world over, than since the Christian era began.

The object of this paper is to give such a compendium of State preventive medicine as shall best present to the people its claims upon their confidence and support, and to show, not alone by my own observation and experience, but by the reliable evidence of the highest authorities, what it has done, what it can do, and what the highest public good demands. In support of the argument, I have made free use of Reports, foreign and domestic, and other valuable documentary evidence, not generally accessible.



# POLLUTION OF STREAMS.

---

BY PROF. WILLIAM H. BREWER,

Sheffield Scientific School, December 17, 1878.

---

Scientific investigation gives us each year more light and new facts relating to the influence of the waters of a place or region on its healthfulness. Year by year our knowledge increases of the amount of sickness and death caused in some way by impure water, either through its use as drinking-water or through the effect of its exhalations polluting the air we breathe.

It has been proved beyond any shadow of doubt that many diseases are spread by or through drinking-water. In several rather recent epidemics which may rank as pestilences because of their destructiveness to human life, we have certain proof that this was the medium through which the disease spread. The subject is important to the dwellers in city and country alike, and when better understood, the annual percentage of deaths in this State will be sensibly less.

There is probably not a health board in the whole world which does not find that practically, and in fact, one of the most common problems it has to deal with is the contamination of water in some way so that the health of persons is affected or imperiled, and which does not see numerous cases where disease and death are traceable to this source, either directly or indirectly.

The protection of waters, public and private, from such pollution as affects health, is no new matter; the problem of how best to do it is as old as civilization, if not indeed as old as the race. What modern science has done has been to bring out more vividly its importance, to show more definitely what the pollution is, its nature, action, and source, and to suggest remedies. The interests involved are so varied, affecting important industries as well as the health, and the necessities of getting rid of the sewage of towns, often making one community suffer that the other may be bene-



fited, and other considerations so complicate the problem that no one line of investigation can solve all the questions that arise.

When chosen by this Board to consider the subject of "Pollution of Streams and Water Supply" in this State, I accepted with a realizing sense of the responsibility involved. I believe that what is done should begin with a better knowledge of our local conditions and local problems, rather than those general considerations which form the elementary ground-work of all work on this subject. The fragment of year I have had has been too small to allow more than the beginning of investigations, the results of which must be left for another year's report.

One function of any health board is to instruct the public in the elementary principles of public sanitation; but I am not clear in my mind how far it is advisable to attempt this through the annual reports which by law are restricted to a thousand copies. The public press is unquestionably the means by which the whole public can be most effectually reached, and it seems important that through this medium the subject of water pollution and its relations to disease should be often brought before the public.

---

---

THE  
REGISTRATION OF VITAL STATISTICS  
IN  
CONNECTICUT.

BY  
PROF. C. A. LINDSLEY, M.D.,  
NEW HAVEN.

---

MEDICAL DEPARTMENT, YALE COLLEGE, DECEMBER, 1878.

---

---



## REGISTRATION.

---

It is one of the remarkable illustrations of real progress in modern times, that up to a very recent date, in the history of civilized mankind, no visible efforts whatever were made to ascertain the number of births and deaths within a given period, or the actual population of any political organization or state. It seems surprising to us that the cultured Greeks and the practical Romans should have overlooked the great importance and the political relations of these matters. After the decline of the Greek and Roman civilization, it is quite intelligible, however, that they should be neglected through the dark period of the middle ages. Doubtless after the reviving influences of the Christian era, the subject would have received much earlier attention had not a theological element interfered and retarded any early efforts to obtain statistical information respecting the condition of the people. As in the time of Galileo, misinterpretation of the Holy Scriptures barred the progress of astronomical investigation; so for long after, certain words\* of the Bible were understood to imply that any attempt to number the people was contrary to the Divine will, and would provoke the resentment of God.

It has been only in quite recent times that any have been bold enough to declare that it is not sinful to "number" the people, but a positive duty of those to whom the interests of the people are entrusted, not only to number them, but also to obtain as much other information bearing upon their physical condition as is convenient, in order that it may be best known how to promote the people's welfare.

To England, more than any other country, belongs the honor of

---

\*1 Chron., xxi: 1. "And Satan stood up against Israel, and provoked David to number Israel." Seventh verse: "And God was displeased with this thing; therefore he smote Israel." And again, chap. xxvii., 24th verse: "Joab the son of Zeruiah began to number, but he finished not, because there fell wrath for it against Israel."

establishing the foundation upon which is based the most successful system of the registration of births, marriages, and deaths. Whatever of the character of science belongs to the study of vital statistics, is due, in great part, to the persevering earnestness and effectiveness with which the subject has been pursued in that country.

It is the policy of the English government, when it has determined upon an important undertaking in any department of the civil service, to address itself to the execution of it by applying to it at once the means and the men which are best adapted to carry it to a successful issue. The conservative nature of their government, and their long experience, have established settled maxims and rules of legislation, by which, as a matter of course, the men for official trusts are chosen with an intelligent discrimination respecting their fitness for the duties to be imposed upon them. And they in turn, confident of the positions to which they are appointed, and not subject annually to the fickle caprices of a popular election, give their attention to the fulfilment of their trusts, as to a permanent pursuit, from which they are not liable to be ejected at the next turn of the political crank. And so they devote themselves to discharge the duties of their office with the enthusiasm and zeal arising from personal interests.

In this special branch of the civil service in England, a most remarkable progress has been made ; and it is largely through the special efforts of its officers. By their own personal influence, and by their writings and addresses, diffusing the knowledge which they acquire among the people, England has advanced beyond all other countries, both in legislation respecting the vital statistics, and in their practical results. But under our government, "the best government the sun ever shone upon," the circumstances are vastly different. The uncertain tenure of office, the character of the officials, who so often hold their positions as a reward for party service rather than because of fitness for their duties, have, with other things, almost wholly divested this service of any feeling of interest or zeal in its performance. So it has too often happened that the registrars of births, marriages, and deaths have performed their duties in a perfunctory manner—indifferent to, and perhaps even ignorant of, the magnitude of the interests entrusted to them. Neglect on the part of officials has been contagious, and seriously affected those whose duty it is to furnish the registrars the facts for record. It is the lamentable truth that in almost every town in the

State, disregard of the requirements of the law, both by physicians and clergymen, is so common as to excite no attention. Even mutual agreements are often arranged between them and the registrars, by which the methods of the law are ignored and their own adopted instead. Indeed, there are many physicians and some clergymen who wholly neglect, under any methods, to render to the registrars certificates of births, marriages, and deaths.

#### PUBLIC SENTIMENT—A FORCE, TO BE CULTIVATED AND UTILIZED.

The great governing power in our times is public sentiment. Legislation is an apt and ready means of carrying into effect and making practical public sentiment. But legislation opposed to public sentiment is inert, inoperative, and almost a blank.

Not only in Connecticut, but everywhere, the prominent hindrance to exact registration of vital statistics which has been encountered, is, public indifference. The people are not informed of the importance of the subject, and do not appreciate its value. The recording and preserving a few facts concerning the birth, marriage, and death of the individuals of a community does not impress the common mind with any ready appreciation of its utility. The scant attention that it occasionally attracts among the people too often only provokes the half scornful and wholly uninterested question, "What's the use of it all?" The average American citizen is eminently practical, and his never-to-be-surrendered love of liberty will not tolerate any new restrictions upon his personal actions, or the imposition of any new social duties, unless they commend themselves to his approbation by their practical utility, and their promise of results productive of personal advantage. The first most desirable thing, therefore, to bring about is the education of the said American to the just appreciation of the value of vital statistics. He must be taught to "see the use" of them. Just as soon as a fair majority of the people can be made to understand that the collection and full registration of the few particulars relating to the three great events in a human life, viz., the birth, marriage, and death, may be made the source of information which is essential to their physical and social happiness, health, and prosperity, then may success be expected. We can rely with confidence upon the expectation that our citizens are sufficiently endowed with the selfish principles of human nature to look out for their own interest when the certainty of that interest once is made plain to them.



## THE ADVANTAGES OF REGISTRATION OF VITAL STATISTICS.

They may be enumerated chiefly under three heads:

1. As affording a reliable record of certain events, which are often essential to be proved in establishing the rights to, or the just distribution of, property, and also as aiding by its inquisitive requirements in the detection of crime.

2. As determining the condition of the people in their social relations, and the influences which control the gradations in society, their habits and practices, and their social trend.

3. As ascertaining the sickness and mortality, with reference to the causes, and the comparative prevalence in localities, and the death rate. A fuller consideration of these points may not be unprofitable.

*The Value of such Records, as Evidence, in the Protection of Individual Rights.*

The vicissitudes of life are so frequent and inevitable that it is impossible to predict with certainty who of our immediate neighbors may be, in the near future, raised from poverty to affluence, or reduced from the enjoyment of luxuriant abundance to pauperism. In all the rapid and varied changes among individuals in their social relations, constantly going on about us, so much depends upon the exact facts relating to the births, marriages, and deaths of persons, regarding titles to property, and other civil and legal rights, that to a reflective mind no doubt can exist of the great value of exact registration of these three signal epochs in the life of individuals.

The accurate registration of the birth, marriage, and death of each individual is an obligation due alike from the citizen to the State, and from the State to the individual inhabitants, which ought not to require discussion, but which should be accepted as an admitted truth almost self-evident.

How often have persons failed of securing their rightful claims to property because of the broken link in the lawful evidence which such accurate registration would have infallibly supplied!

The frequency with which the registration of these events in Connecticut are called into requisition in the settlement of disputed claims is sufficient evidence of their value. The writer is not aware that any registrars have kept note of such calls upon their records, but can only state, from personal knowledge of facts in New Haven,

that they are often the source of reliable and important information that was not otherwise attainable.

The Report for 1870 of the Board of Health of New York city, speaking of this matter, says: "There are constant applications for transcripts from the Records. These transcripts are not only used in this country, but are sent to almost all parts of the world, where they are employed as evidence in legal claims.

"On account of its great legal value, the most progressive and intelligent nations of Europe have adopted this system of registration which is highly esteemed by their citizens, as it contains a concise biography of persons holding the highest as well as the most menial positions in the land. Some idea of the value of such registration may be gained by the fact that from June 1st to Dec. 31st (seven months) there were issued from the Bureau of Registration in New York, to applicants who considered them indispensable to accomplish the purpose for which they were needed :

Transcripts from the Records of Deaths,	773
Transcripts from the Records of Marriages,	157
Transcripts from the Records of Births,	76
<hr/>	
Total number issued,	1,006 "

In New York, the records of births and marriages are very incomplete as compared with the death records, which, in part at least, accounts for the fewer number of transcripts, the incompleteness of birth and marriage records not affording the information often sought for. These facts illustrate not only the great necessity of complete and full records, but also the still greater importance of entire accuracy as to statement, because inaccurate or erroneous records might be the means of a deprivation of property, inheritance, identity, or social standing.

If it were practicable to secure the prompt registration of the immediate facts connected with the three most important epochs in every human life, it would be the source of information not only of present, but often of far greater future value. Every birth, marriage, or death which takes place exerts an influence which concerns the interest of many others, perhaps not yours or mine now, but may sometime concern even our welfare. The complete registration of such facts, for an extended period of time, and concerning large communities, would afford a basis for generalizations, and the recognition of natural laws, productive of the most valuable

results. The practical application of such a storehouse of facts are not limited to a single field of utility, but will be witnessed alike in their hygienic, social, and economic uses.

#### A MEANS OF DETECTING CRIME.

Prompt and accurate registration of these events would be a direct, and frequently an effectual means of detecting crime, and indirectly of preventing it, in no small degree. Its relations to the crime of infanticide—to the practice of criminal abortions, to the detection of the frequent fatal results of quackery, and even in some cases of willful murder, will suggest themselves to any intelligent mind.

Within the past year, in New Haven, an inhuman father was brought to justice for the criminal abuse of a young child, through the agency of the certificate of death. The child died; and by the local law of New Haven, it could not be buried until a permit was obtained from the Registrar, after presentation of the certificate of death. The marks of violence upon the child were so conspicuous, that the physician gave as the cause of death, "bodily injuries inflicted by the father."

The Registrar would not give a permit for burial on such certificate, and reported the case to the coroner. The guilty party was arrested and indicted, and is now in jail awaiting trial for murder in the second degree.

If the practice followed in some of the other towns in Connecticut had prevailed in New Haven, viz.: to bury the dead without hindrance, and let an undertaker or some one else give a certificate at the end of the year, the criminal would never have been publicly exposed or punished. Other similar instances might be adduced as occurring in New Haven, not infrequently. Such facts illustrate in the most satisfactory manner one of the uses of requiring "permits" for burial.

#### A MEANS OF STUDYING THE INFLUENCES WHICH GOVERN THE SOCIAL RELATIONS AND THE GRADATIONS OF SOCIETY. •

The registration of Vital Statistics possesses a public and permanent value far exceeding any individual and temporary importance, in solving many questions respecting the social condition of communities, and the progressive changes in the habits and practices of peoples. Its direct bearing upon the relative prevalence

and causes of prosperity or pauperism—of high intelligence and morality, or of vice, intemperance, and degrading pursuits,—of vigorous physical development, or of feeble, low vitalized, and unsymmetrical bodily organizations, is all too obvious to require comment or illustration.

An accurate and extended registration of the great facts included in the expression, "vital statistics," would be invaluable in discovering those influences which affect society unfavorably, and not less valuable to guide and direct our efforts for the correction of such unfavorable social conditions.

It is not foreign to this branch of the subject to allude to the value of these accumulated and systematized facts, in their bearing upon the most important questions concerned in the business of life insurance and life annuity companies, in which the interests of so many families in every community are concerned. But an allusion merely to the obvious relation of vital statistics to the bases upon which these great businesses are conducted must suffice. The subject is too extended to discuss fully in this paper.

#### REGISTRATION IN ITS RELATIONS TO SICKNESS AND THE DEATH RATE.

The third point under which the advantage of registration may be considered is, as a means of ascertaining the amount of sickness and mortality, with special reference to the causes—the comparative prevalence in localities, and the *death rate*. We all know, in a general way, something about these things. Some localities have a reputation for salubrity—others for unhealthfulness. We regard some places and circumstances as dangerous to infantile life, and others as favorable. Some places and occupations are more hostile than others to the health and lives of adults, while we recognize local influences to be favorable or otherwise to the aged, and again, in some towns and regions, one or more diseases or classes of disease are readily developed, and their progress is rapid and fatal; while in other places the same diseases do not occur, or are manageable and safe. So, too, we know that chronic diseases of various kinds are hastened or retarded in their course by the hygienic condition of different places.

These facts, and many others like them, are already known, as matters of common reputation, but our knowledge is too general and vague for practical use. What is required is, to make it definite and exact. To know by positive data how much the rep-

utation of a given place is due to the exaggerations of Madam Rumor, prompted by the suggestions of private interests, and how much is based upon precise estimates of the healthfulness of actual residents. We must, in some sort, take the dimensions of this kind of knowledge by such means as are practicable and reliable, and estimate its true value by arithmetical computation.

No better means have yet been found than by the careful and complete registration of the causes of death, in reference to whole populations. An incomplete or inaccurate registry is always misleading and deceptive. So, too, if the registry is only partial as regards extent of territory, if full and exact in some places, and defective or wanting in others, the study of comparative salubrity is defeated.

It is an accepted fact that local influences differ much in different places and seasons. One of the grand objects of registration is to discover these influences, their differences and their results, as well as the means of controlling them. Hence registration, to be most useful, should be *general, full, and accurate*. When it is so, surprising results are sometimes obtained. Thus, in a registration report of Massachusetts, it is stated that in Suffolk County the average duration of life is only twenty years (discarding fractions), while in Hampshire and in Duke Counties, it is forty years. From the English reports on registration, we learn that a child has a chance of living forty-five years in Surrey, but only twenty-five in Liverpool.

By this system of registration, and by no other yet devised, can the life line for distinct communities be so definitely drawn. A few years ago, it was officially stated that the average duration of life in London was twenty-seven years, in Liverpool but twenty; while it was forty years in Geneva, Switzerland, and forty-one for the people of Plymouth, Massachusetts. The indications it affords of unsanitary localities are scarcely less definite, and enable the public hygienist to designate with unerring certainty, the places where pestilential disease will be first developed, and rage with greatest destruction. Shall not such facts as these arrest the attention of legislators, and give more significance to the ready question—“*what is the use of it.*”

“Diseases are more easily prevented than cured, and the first step to their prevention is the discovery of their exciting causes.” Says Dr. Hobbins, of Madison, Wisconsin, “registration teaches us every day, that which every day should be brought to our



knowledge, that we may and do, in a large measure, weave the web of our own life. That death being, for the most part, the result of influences by which we are surrounded. We have it greatly in our own power to make those influences conducive to life, or to our destruction. Our habits either make or mar us. Our eating, our drinking, our clothing, our personal cleanliness, our school-rooms, our church buildings, and even our legislative halls; the air and situation of our houses, our houses in their construction, material arrangement for heating, lighting, and ventilation—their very newness; our occupation, our education, etc.; all alike have an influence for good or for evil, and all alike come strictly within the province, within the legitimate consideration of the vital statistician.”

The arguments and illustrations which might be presented, setting forth the value of systematic and thorough registration of vital statistics, are inexhaustible, and might fill volumes; but the above are sufficiently suggestive to convince intelligent minds that the interests of the people of Connecticut are involved in the successful execution of the registration laws in many ways, which most deeply concern their wealth as well as their health.

#### THE PRACTICAL WORKINGS OF OUR REGISTRATION LAWS.

More than a quarter of a century ago the Legislature of Connecticut appreciated how intimately the interests of the people were associated with the registration of vital statistics, and in 1852 repealed the old laws pertaining to the subject, and enacted new ones with fuller and more definite requirements. These have from time to time been modified and amended, with a view to more satisfactory results. As they stand upon the statutes to-day they are both in letter and spirit in most respects adequate to the purposes designed. But a practical difficulty has always been experienced in obtaining a ready and full compliance with them, by those upon whom are imposed the duties of giving the information to be registered. The imperfect, and in some respects valueless results, are not so much because the laws are defective in their requirements, as because the laws are not generally obeyed, and it is not made the positive duty of any officer to enforce them. Besides the registrars appointed in each town to keep the records, the duties required by the laws fall chiefly upon the members of the medical and clerical professions—who, of all men in communities, are sup-



posed to have, both by nature and education, preëminently the intelligence which would put the highest value upon this work. While it cannot be disputed that there are many individuals in the ranks of these professions who do so esteem the work, and to whose unrewarded labors its present advance is chiefly due, yet it is to be deplored that there are a great many in both professions who treat its requirements with a tardy and careless obedience in some cases, and in others with almost entire neglect; and the writer has reliable evidence that there is in many towns in the State one or more doctors, and sometimes a minister of the gospel, who defiantly refuse obedience, and make no reports for record. The essential features of the present laws on the registration of vital statistics are, that there shall be provided and distributed to all persons who are likely to need them, blank forms for the certificates of births, marriages, and deaths. That such persons, viz., clergymen, physicians, midwives, coroners, and all who may be officially acquainted with these events, shall fill out such certificates on every occasion, and return the same to the registrar of the town in which such event occurred during the first week of the month next succeeding; also, that the registrar in every town shall record the said certificates in books prepared and furnished for that purpose. The laws also provide that the registrars in their respective towns shall obtain the same information for record whenever a birth or death has happened for which no certificate has been returned.

It is quite clear that if these laws were fully complied with by all to whom they apply, the registration of vital statistics would be so nearly perfect that the deficiencies would be almost inappreciable. The facts, however, are that in many towns the laws are so much neglected that the records for some of the most important statistical uses are wholly worthless.

To ascertain as definitely as possible what is the practical working of the laws on registration throughout the State, I issued the following questions to every registrar in the State:

NEW HAVEN, September 14, 1878.

*To the Registrar of Births, Marriages, and Deaths.*

DEAR SIR:

*1st Question.* Will you be kind enough to inform us whether the certificates of Births, Marriages, and Deaths in your town, returned to you, enable you to make your records complete and satisfactory?

*2d Question.* What proportion of the *causes of Death* are given by Physicians, and what by other persons?

*3d Question.* Are the returns made to you monthly, as the law requires? If not, when?

Please make any suggestions which you think would secure more accurate registration.

N. B. Answer questions by number; and you will greatly oblige if you will reply within one week.

Very respectfully yours,

C. A. LINDSLEY, M. D.,

*Committee of State Board of Health.*

There are 167 towns, and I have received answers more or less explicit from 131 of them. From 36 towns, among which is the capital, I have received no reply. To the first question—Do the certificates returned to you enable you to make your records complete? only 63 give an affirmative answer; and 68 towns say the records are not complete and satisfactory, although many registrars speak of their personal efforts to correct the deficiencies each year before making their annual report.

To the 2d Question—What proportion of the causes of death are given by physicians? the replies from 44 towns are, "all;" from 56 towns the replies are, "mostly," or a fraction above one-half; from 16 towns the answers are expressed in fractions from  $\frac{1}{2}$  to  $\frac{1}{100}$ ; from 7 towns the indefinite word "partly," is the reply; from 3 towns, "none" of the causes of death are given by physicians. In one of these, the registrar obtains the certificates by paid agents. In another, the school committee make all the certificates, annually. Fifteen respondents do not answer this question.

To the 3d Question—Are the returns made as the law requires, monthly? only 15 registrars answer in the affirmative. In 76 towns it has been the practice to make returns only once a year. In many of these the registrars speak of the difficulty, and often of the impossibility, of getting them from the doctors. From the remaining towns the general tenor of the replies is, that the returns are irregular. In many of these towns, some physicians and clergy are prompt and accurate, and others in the same town are negligent or refuse entirely. Several correspondents speak of the frequent omission to state *all* the particulars required in the certificates. This would be an inevitable result where the returns are made only once a year; especially if the facts had to be ascertained at that time, or were stated from memory. Even when the certificates are fully made, there might be a question of their accuracy, if written at a period so long after the occurrence. And it might

be a question, too, whether the value of the records, based upon certificates made many months after the events, and specifying so many particulars, is not entirely vitiated, as evidence in courts of justice, and thus one of the important objects of registration rendered null and void. Or is the danger greater, that if received as evidence, some error on record, by defect of memory, may defeat the ends of justice? In whatever way it is considered, there can by no valid reason for delaying the recording of events of such important consequence to individual and public interests until the facts which are to constitute the record are lost or rendered uncertain by lapse of time.

Some opinion can be formed of the results of registration in Connecticut, by a careful perusal of the following extracts from several of the correspondents who have replied to my circular. The selections are intended to exhibit the defects in the practical working of the system under the present laws. There is no arrangement of these extracts attempted, other than the alphabetical order of the towns from which they are sent. They might be more numerous, but I think they are sufficient to illustrate the facts.

*Branford*.—"Perhaps a more perfect registration of deaths would be had if a permit was required for every interment."

*Bridgeport*.—"I am very glad to get the returns by the middle of January of each year. In my opinion, the statute requiring permits to be issued by the Registrar before a body could be interred, should be reënacted—the time during which said act was in existence being the only period during which complete returns have been made by the doctors. The physicians here concur."

*Clinton*.—"I keep account of the deaths as they occur, and if no one hands in a certificate of death, I fill one out myself after inquiring into the case."

*Colebrook*.—"I have never received a certificate of birth or death from a physician in accordance with the law since I have held the office of Registrar. My records for last year I consider complete, but obtained by my own personal efforts and inquiries. The causes of death are almost entirely given by members of the family, or from my own personal knowledge."

*Danbury*.—"I have tried to have all the doctors report monthly, but do not succeed. I wish something could be addressed to them which would cause them to report as the law directs."

*East Granby*.—"I have every year except 1869 rode round the town about the 8th to the 10th of January after births and deaths. One doctor in Suffield, who has practised in this town for several years, has never

made a return to me. Last year I had to ride around town and get three-fourths of the deaths, with the best information I could about them; and at my age—now nearly 72—it is not desirable business. Now for suggestions: A man that holds an office and does not feel proud of discharging the duties of it, and that, too, correctly every time, is not fit to hold an office. A doctor that does not feel proud of making full and correct returns of all births and deaths where he is employed, and that, too, as required by law, ought to be exposed to the public. Let the people look at him; let every Registrar in the State report to the State Board of Health the name of every physician that fails to make returns, and have the name published annually. A law imposing a fine would avail nothing, for it would not be enforced."

*East Haddam.*—"The returns are very incomplete; in fact many only examine the *lists of coffins* furnished by the undertaker, and get the name and age from him, and report nothing more. I would suggest that a law be passed to the effect that if the cause of death is not filled in, and other necessary information, no fee shall be paid the physician who makes the return. I think so long as the doctor gets his twenty-five cents he does not care for the trouble of doing his whole duty. Then if it could be that the State Board could prosecute, by themselves or by agents, any neglect of duty, instead of the Registrars, it would have a good effect. Registrars are generally near neighbors to the physicians, and in country towns prefer to let the office go rather than make enemies, especially if the delinquent is the family doctor."

*East Lyme.*—"About half the death certificates are made out and returned by the sexton."

*Enfield.*—"I have to depend upon the sextons for the cause of death in one-third the cases."

*Farmington.*—"With regard to births, the returns are well attended to; the names of children have been very much neglected; the fault lies more with parents than with doctors or midwives. The marriage certificates are generally returned by Protestant clergymen; the Catholic priests are careless, and some marriages by them are never certified to me. Death certificates are not fully returned by physicians. Our laws are good enough. Doctors seem to be very loth to make returns of deaths."

*Groton.*—"Physicians make no returns in this town. By vote of the town, the School Committee of each district make returns at the close of the year, when they enumerate the children; and I think too little interest is manifested in them to meet the demand."

*Guilford.*—"I have more trouble to secure the names of children, so as to make a perfect record, than anything else connected with it."

*Glastonbury.*—"Physicians, in case of death, generally call it something; whether it is right or wrong I don't know. The worst trouble is to find out where a person dies and no doctor attends them. Doctors are very careful not to return any more than they doctor."

*Kent.*—"We are within a mile or two of the State of New York, and

many births and deaths are attended by physicians over the line, who do not make any returns."

*Litchfield.*—"Marriages are fully reported, but only about two-thirds of the births and deaths get reported. Some of the doctors fail to send in their returns at all, notwithstanding much importunity by Town Clerk. Many cases of births are not attended by any physician, and do not get reported by any one."

*Middlebury.*—"A small proportion of the births and deaths occur without the attendance of any physician. These, of course, are troublesome to perfect, partly owing to the necessity of making special inquiries, and perhaps a journey, and partly from the lack of appreciation of the work on the part of the public. Town Agents hardly understand the necessity of the expense. I remember that the First Selectman, in speaking of my predecessor, said: 'He came into my neighborhood, two miles, to hunt up a case, just for the sake of a twenty-five cent fee!' If from haste or oversight the physician omits to take immediate notes, he hardly ever finds another good opportunity, and he either neglects it or he takes trouble enough to vex his generous soul."

*Middlefield.*—"After the certificates by physicians are in, I have usually sent a man to gather carefully the items of births and deaths in the town, and he furnishes say half the certificates, and ascertains causes as best he can."

*Milford.*—"What the physicians omit the sextons supply. We do not get more than ten per cent. of the given names on the birth certificates, and no provision is made for obtaining them subsequently."

*Monroe.*—"It is impossible to get the physicians to send in their returns, or the most of them. What shall I do if they do not make returns as the law requires?"

*New Britain.*—"Most of the births not reported are where the services of a midwife are employed, and it is almost impossible to know who are thus acting. I would suggest that all such be licensed, with a penalty for acting without, or that they be required to report their names to the Town Clerk or other proper officer under penalty for neglect."

*Newington.*—"The returns are one per cent. exactly, by physicians, the other ninety and nine I investigate."

*New Milford.*—"In the last ten years I have recorded 698 births in all, and there are only 108 that have a name on the record, and there are undoubtedly some births that are not returned. In the same time I have recorded 572 deaths in all, and one-third of them I took from the books of the undertaker, who informed me as to the cause of death as well as he could. About one-fourth of the one-third are recorded as unknown."

*North Haven.*—"Some of the physicians reside out of town. They are not particular to return their deaths at all, and some do not return births. I would suggest a law making it a penalty for a sexton to inter a body without a certificate from the Registrar, who in turn could not issue a permit without a certificate from a physician, except when no physician attended."



*Norwalk.* "Two-thirds of the certificates are by physicians, the rest by undertakers. I think we could get a better registration of deaths if the undertakers had to have a permit to bury."

*Norwich.* "The law passed requiring a permit to bury the dead was a good one. Then you was sure of getting every case of death, but the people were very much opposed to it in the country towns, and it was repealed. If the fees for a permit had been made payable by the town, I think perhaps there would have been less objection to it."

*Oxford.* "I verify and correct where I do not attend. If a case is returned by a 'Homœo,' as 'Inflammation of the Bowels' when the disease was Typhoid, I class it where it belongs."

*Pomfret.* "I have to make enquiries at times in all the districts to make my records perfect, and expect to have every birth and death on record. The cases where no returns come in are where there are no attending physicians. It is a Connecticutism that the laws are not put into every family, and so some of them don't know the law."

*Roxbury.* "I would suggest for the more accurate registration of births, the passage of a law fining the fathers of all unreturned Babies \$5.00, and making it the duty of registrars to collect it for their own benefit."

*Somers.* "The great difficulty in this matter of registration arises from the heedless manner in which some physicians fill out the blank returns, seeming not to take the trouble to fill out more than about half of the blanks on the certificates. The name of the child born is oftener omitted than inserted. I have on my records of Births for the last twenty years, 300 without a name. What a splendid record this will be for those who wish to examine them, say seventy-five or a hundred years hence! What perplexity and vexation they would encounter! Now I have not the least doubt that this great neglect to return the name exists in every town in the State. The excuse of the physician is, when he makes a monthly return, that the child has not been named; this undoubtedly is true, but he has no ground for such excuse when he returns by the year. I am aware the law gives the registrar the right to perfect his records at any time. But is he going to spend his time going around to get the names of births to perfect the certificates of those who receive pay for them. He will not be willing to do it without compensation. Now if he should receive twenty-five cents or so, it would be an inducement to get the names."

*Stratford.*—"Think the law defective in regard to payment—the Selectmen should investigate as to return made once or twice a year, and send to the persons making such returns a town order for amount due. A non-resident physician will ordinarily spend more time running after the small amount due them than receipts will pay them for." "The borough of West Stratford adjoins Bridgeport, and Bridgeport physicians practice there almost exclusively. I get not more than  $\frac{5.0}{100}$  of their cases, which makes a defective record for about one-third of the town."

*Sherman.* "The certificates are returned just as it happens."

*South Britain.* "The returns are mostly made when I solicit them. The only trouble is, the doctors are careless in the matter, and the records would be very imperfect if the Registrar did not attend to the matter."



*Southington.* "The physicians here are all very delinquent about getting in their returns."

*Suffield.* "In looking up genealogies I find that the record of some families are very imperfect, owing to the fact that they employ physicians out of town, and those physicians are not particular in making their returns out of their own towns."

*Stonington.* "In the first of January I have to devote a week, and go all over the town after the certificates, and if I get the returns in without going after them more than once, I am lucky."

*Thompson.* Possibly one-fourth of the causes of death are given by physicians. The Catholic Priest returns one-half of the whole. I would suggest a specific law, that towns should not pay for the certificates unless returns are made on time.

*Torrington.* "I am unable to make my record complete or at all satisfactory from returns of physicians. The returns are so incomplete that in January of each year I have been compelled to employ a man to canvass the town, and procure information as to births and deaths of the preceding year. I pay him twenty-five cents for each certificate, being the legal fee allowed to physicians. One physician in town I can hardly induce to make any returns at all, and those he does make are grossly defective. I find it impossible to get any returns at all from physicians residing out of the town, who have officiated at births or deaths here." "It is very evident to my mind that the system of registration required by our statutes, however good in theory, is fatally defective in practice as far as entire accuracy is concerned."

*Warehouse Point.* "I think more accurate returns would be secured if no fees were allowed upon certificates which are incomplete."

*Waterford.* "Am not able to make my records complete or satisfactory. I receive no returns monthly. I receive them only once a year, about the first of January. The most I get, I find out by the column of deaths in the paper, and what I know at the time of their death."

*Watertown.* "If means could be devised to obtain the names of children it would be a great improvement. For instance (as is possible) a father has three sons born in three successive years. When wishing to prove the age of Tom, or John, or Jim, years hence, and no names given, who can tell which is which? Physicians should be compelled (if possible) to obtain the names of infants. Now we do not get five from one hundred births."

*Weston.* "Physicians who reside out of town, who sometimes have cases to attend here, do not trouble themselves to make returns to the registrar."

*Windsor Locks.* "To secure more accurate registration it would only be necessary to enforce the law to make the returns monthly."

*Wolcott.* "The records are not complete. There is scarce one single instance where the cause of death is given by a physician. The returns are made with no regularity; what is done is through my exertions."

The above statements and opinions from every part of the State, indicate clearly enough that the registration of vital statistics in Connecticut falls very far short of that completeness and accuracy which the laws upon the subject require, and aim to obtain. There is also revealed, through these correspondents, several defects in the laws, and certain positive hindrances to their successful operation, which it should be the object of further legislation to remove. It is gratifying to know that many of the Registrars, in their communications, have mentioned that since the State Board of Health has issued a circular upon the subject, there has been a marked improvement in rendering the returns.

The very general failure to get a record of the names of new-born children, is a fault which demands a remedy. It is quite obvious, that under existing laws it will be impracticable for the physician to render to the Registrar the name of the child, on all his birth certificates, because so very few of them are named at the time when the law requires him to make the return. There would be some encouragement to prolong the time for returning them, to three or six months, but the testimony of my correspondents is, that the evil is not in the least abated, when the returns are made only at the end of the year, as is the general practice in seventy-six of the towns reporting to me, and to a considerable extent in many others. So that experience teaches that nothing would be gained by such a change in the law, and much would doubtless be lost by the inaccuracies and omissions in the certificates, from the attempt to state the facts so long after their occurrence. The present law, it is quite apparent, is not competent to the object—it is not adapted to the situation. It is a seeming attempt to make bricks without straw. Still, it is good so far as it goes. It should not be abolished, nor changed, only an additional provision is requisite to make it effective. Let the law continue as it is, requiring the physician to return his birth certificates monthly; because, during his professional attendance upon the mother, he can obtain all the information required by law, except the name, most easily and correctly. Then make it the duty of the Registrar to inquire personally, at a time not longer than three or six months after birth for the name of every infant born in the town for which he has the physician's certificate and upon which the name is wanting, and the Registrar shall receive for such service, and for completing the record, the sum of \_\_\_\_\_ cents, for each name so obtained and recorded, to be paid by the town.

The objection may be made that this will cost more. So it will, and so it should—for it involves more labor and time. The physician can not afford to do it, even for the additional fee—it is not professional work, and can be done by another as well as by him. It will pay the Registrar satisfactorily, for he will have all the babies in his town, and can do his work systematically, while each physician would have to spend a much greater time proportionally, upon the few that he has attended.

In regard to the death certificates, only one practicable method of securing them all, has yet been devised. That method is, by prohibiting the burial of the body of any deceased person without a written "permit" from the Registrar, which it shall be his duty to give, on reception of the legal certificate.

For each burial permit the Registrar shall receive a fee of cents, to be paid by the town, and shall make no charge for it to the applicant.

This has been the practice in New Haven (in compliance with a local town law), for several years. Excepting that the applicant for the burial permit pays a fee of twenty-five cents, instead of collecting the fee from the town, as for several reasons I think should be the law. It works easily and satisfactorily, and ensures complete returns for every death, and it will always be the Registrar's fault if he accepts certificates which are not properly filled out, as the law requires. It is very satisfactory to the physicians, because they are relieved of the duty of delivering their death certificates to the Registrar, and give them only on demand, to the friends of the deceased. Such a law, for a brief period, did prevail in the State, and was hastily repealed by the succeeding legislature, because it was represented to be difficult and troublesome, in the country towns, to procure the certificate and the permit before the funeral. And yet it would be entirely safe to say that one could not name a family in any country town that would not undertake five times the trouble, rather than forego the observance of the fashion of hanging a strip of black crape at the front door, while the body of the deceased friend lies in the house. Public sentiment, as I have already said, is far more potent in its tyrannical demands, than the laws which any legislature can exact.

While the laws on registration have not accomplished all that was expected, or all that they should have done, still experience fully justifies confidence in ultimate success. The undertaking is

not hopeless, and must not be abandoned. The laws are good, and with some amendments and better provisions for their enforcement, they will be found adequate to the purpose, in their requirements. In some places in the State they have worked easily and satisfactorily.

The laws are susceptible of such amendments, and improved provision for their easy execution as will make them adequate in their requirements, and effective.

The State cannot do otherwise than go on in the effort to improve and perfect them.

Every State, and every form of organized society, has duties to perform, which are as important and imperative as those of the individual. In our present civilization, one of the recognized duties of communities is to take note and make record of whatever pertains to growth and development, or perchance to opposite results. And it is the bounden duty of well-ordered government, "to establish such a system of registration of all vital statistics of any importance, as shall enable it, both for the present and the future, to know its own life-history, and the influences that are moulding it for better or for worse, as the years pass on."



---

ON  
EPIDEMIC, ENDEMIC, AND CONTAGIOUS  
DISEASES.

BY C. W. CHAMBERLAIN, M.D.,  
HARTFORD,

Member of the Advisory Committee of the American Public Health Association, Secretary of the Connecticut Medical Society, etc.,

SECRETARY OF THE BOARD.

---





## EPIDEMIC, ENDEMIC, AND CONTAGIOUS DISEASES.

---

The diseases that have prevailed extensively belonging to this class have been diphtheria, typhoid fever, diarrhœal diseases, typho-malarial fever, scarlet fever, about in the order named, and of the minor contagious diseases, mumps and whooping-cough.

The first extensive outbreak of disease that attracted attention was the epidemic of diarrhœal troubles in Hartford that followed the substitution of the river water for that from the reservoirs in West Hartford, in September. The onset was sudden, severe, and extensive, limited to the region supplied by river water, with no more than the ordinary number of diarrhœal cases common to the season in the portion not thus supplied, and in the State generally. The cases were marked by severe gastric pain, oftentimes vomiting, profuse diarrhœa, prostration, in many cases, and the recovery, when rapid, leaving an uneasy and painful condition of the bowels, lasting for weeks. In many cases the recovery was protracted, dysentery followed, and during October an unusual frequency of cases of typho-malarial and typhoid fever occurred at the proper time to have been thus caused, with a larger mortality in October from typhoid than has been reported for eighteen years, which was as far back as the records were examined. The sudden extensive and limited outbreak led to the suspicion of the water supply, as it is generally conceded that such outbreaks are due to contaminated water supply. Nearly every family in the affected district had one or more cases, and in many none escaped. The same was true of boarding-houses, where there were often from fifteen to twenty cases. Specimens of water were obtained and examined from the faucets, the reservoir of the pump-works, from the river over the inlet-pipe, and from the center of the stream, also from under a drive of logs above. That from the faucets was most impure, as it contained the sediment from the pipes stirred up by reversing the flow, which, with the other impurities, made an unsavory compound. This was very turbid, opaque at

ten inches, while good water should be clear at eighteen, and the sediment for the most part organic matter, diatoms, animalculæ, fungi, infusoriæ, and the like, indicating putrescible matter, closely resembling ditch water; decaying fragments of vegetable tissue, and even of muscular fibre, proved incontestably sewage contamination. The chlorides and nitrites were in excess, while the permanganate of potassa test showed large quantities of albuminoid ammonia, all of which indicated a water too foul for use. The water in the reservoir was not as bad, but differed only in degree; that taken directly from over the inlet-pipe at the pumping-works showed sewage contamination, while the water in the river was comparatively pure; that from under the logs was not much worse than from the center of the river. On examination it was seen that a large sewer opened but fifty feet below the main inlet-pipe. By the tide, which rises here eighteen inches, and by an eddy the sewage was set back directly over the inlet-pipe of the water-main, and so pumped up into the water drunk. This sewer, where it discharged, was an open ditch, or rather the bed of a sluggish brook into which the ditches from the north meadows emptied with a slight fall, said ditches receiving considerable sewerage along their course. Two large sewers emptied near the outlet of this brook, thus making it a kind of a trunk sewer. Although this condition of affairs had existed, with the differences hereafter noted, for many years, it had never attracted attention, as the water from the river was used only when the supply from West Hartford threatened failure, epidemics of dysentery, diarrhœal diseases among children, and cerebro-spinal meningitis might, it would seem, have suggested something wrong, but nothing ever came of it. Our city fathers, generally, have not yet quite reached the plane of appreciation of preventive medicine, so that we have but one thoroughly organized local health board in the State, although matters are fairly under way in one or two of the cities, with a promise of good results. A pier of stones recently thrown out to protect the pipes helped form the eddy, also an extensive drive of logs for miles up the river. Moreover, the water in the reservoir of the pump-works had not been let out for three years, and river water had not been exclusively used in any portion of the city for that period of time; but when pumping was done, it had been directly into the pipes to reinforce the flow. There were, therefore, the stagnant water in the reservoir, the filth in the pipes, and the sewage pumped up, to contaminate

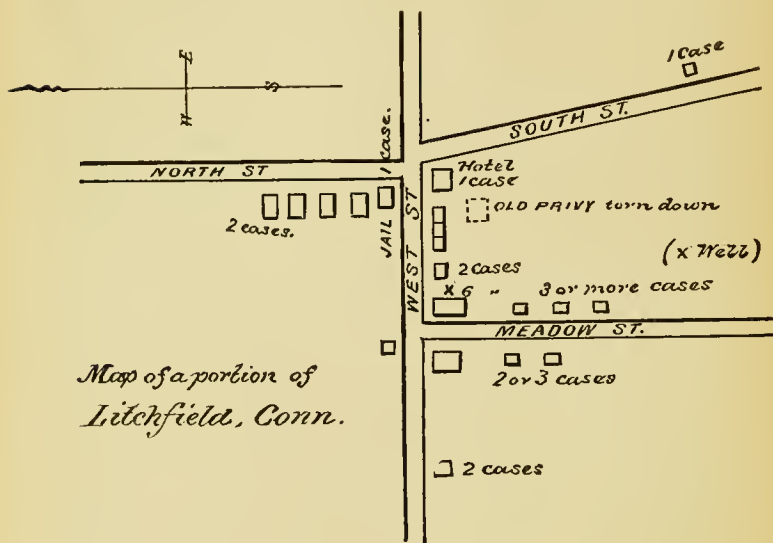
the quality of the water. The pumping was discontinued on remonstrance to the water commissioners, and the outlet of the sewer removed to a point below the eddy. The chairman of the city health board was enlisted in the matter, and rendered valuable assistance. It is to be hoped that a recourse to river water need never be again necessary, still it is a contingency likely to arise at any season.

The reason for escaping constant evils from this source was probably due to the dilution of the sewage when the pumps were heretofore partially relied upon, while many a case of diarrhœal or dysenteric disease might have had its origin in filth thus carried. However that may be, no one would willingly drink polluted water if he could help it. The fallacy that rivers to which sewage gains access purify themselves by flowing, has been productive of an ill-grounded sense of security. The readily oxidizable part of the sewage that gains access to a river is destroyed in the few first miles run, but the portion left is oxidizable with extreme slowness, and is only removed by vegetation or minute animal life, which latter increases in proportion as its food increases; hence water swarming with minute forms of animal life is foul, not because the animalcules, etc., are harmful necessarily in themselves, but the food which supports them is putrescible animal matter, always a source of danger; hence the microscope becomes a powerful ally in determining the sanitary purity of drinking water. These minute forms are not to be confounded with the larger forms of animal life visible to the eye, or under low powers, as these do not indicate any special impurity unless present in very large quantities, but the bacteriæ and allied forms are to be looked upon suspiciously.

#### TYPHOID FEVER.

Typhoid fever has been very prevalent in the State, in certain places, causing eighteen deaths in Hartford; its probable cause has been alluded to already. In Litchfield there were an unusual number of cases, apparently originating from contamination of soil and wells from filth which was allowed to saturate the soil beyond its power of purification. A vault used, for years, situated partially above ground on the summit of a hill, by changes in buildings was allowed to discharge by a shallow drain upon the slope of the hill. On this slope, ran a street, and here the fever commenced and raged most extensively. In the house where the

well was about fifty feet from this mass of filth there were six severe cases, and one or more cases in every family using water from that well.



*Map of a portion of  
Litchfield, Conn.*

The cases were for a long time confined to the side of the street nearest this drain; and cases in nearly, if not every house; later, there were cases on the other side of the street. In addition, an open ditch ran in front of these houses, and the filth from the jail deposited by a pail system on the surface was washed into this ditch to a great extent.

There were at first but few cases outside of the area thus implicated; but a disease that starts from local causes, though at first confined, soon gathers strength and invades quarters that would never have given origin to it. Thus unsanitary conditions and foul dens allowed to exist by sufferance, become a standing menace to the health of the whole community, by whose negligence or indifference they are tolerated. There is no place, however healthful its surroundings and situation, that may not suffer from a neglect of precaution in the disposal of filth, and long immunity only renders the evil more marked when it does come, as from accumulation and soil saturation, the causes for extensive trouble exist, and need only a little variation in the usual

order—like a very dry season, for instance—to render the threatened danger an actual one. Fortunately, in this climate the frequent rains relieve us from the effects of our carelessness often; but the longer a country is settled, and the waste incidental to occupancy, and a necessary consequence of living, accumulates, less and less confidence can be placed upon the soil around our dwellings, which after awhile becomes saturated, and no longer renders the filth it receives harmless; or an excessive quantity, beyond the powers of vegetation to absorb and re-convert, may be placed upon it, air and water, one or both, become contaminated, and disease results. The diagram shows the relation of the first cases to the focus of infection.\*

#### TYPHOID FEVER IN THE GUILFORD BATTERY.

The battery went into camp September 9th, with forty men—twenty from Guilford and vicinity—messed with Co. E of the Third regiment. Of this twenty, fourteen have had typhoid fever; two have died, and many of the cases were severe and complicated. There were no other cases connected with these in any manner, although one of Company E's men was sick, but he was taken immediately on his return home. In the first place, Guilford was thoroughly investigated, and no cause found there. The cases were scattered, and there had been no preceding case of typhoid fever, nor have there been any others, except those among the battery men and in their families. During November there were eight cases quite severe in the families of two of the men, who had been very sick with typhoid fever, and some cases in one or two others. The outbreak of the disease, on an average about two weeks from the time they left camp, also served to decide the question, that infection had been received while in camp. The food was suspected, and exonerated. The men occupied half of each table, Co. E men the other, and food was passed up and down the tables. The milk supplied was used by the whole table and by other companies also. Many of those sick had not been off the camp-ground during the encampment, and therefore could not have received infection from food or drink taken elsewhere.

The disease must then have been received in camp. The loca-

---

\* Some changes in the charter of Litchfield have been made by which powers are granted for drainage and sewerage, which were before lacking, so that all sanitary requirements are fully and completely met.



tion was excellent, the soil dry, naturally well drained, and no part used for tents where latrines had formerly been situated. The soil under the tents of the Guilford battery was very carefully examined, to exclude soil contamination. The latrines in use were well situated and well cared for during the encampment. In the rear of their mess-tent there was a stagnant pool of fresh water, with no natural outlet, receiving the drainage of the higher ground, where the latrines of a former encampment had been situated, and fed by an old spring about five feet deep, said to have been walled up by the Indians, and which had not been cleaned out for years.

On thrusting a stake down, it was found to be filled with a mass of putrescent vegetable matter, five feet deep, which gave forth volumes of offensive gas on stirring; its qualities and potencies needed no investigation. A specimen of water from the pool, however, was obtained and examined as to its sanitary, not chemical, qualities. Water is most vile and impure, in a sanitary sense, that contains organic matter in a putrescent or putrescible condition; and any water is considered usable for drinking that requires the addition of some such substance as sugar, and the maintenance of a temperature of 88 degrees at least for some days, in order to start fermentation; this specimen commenced to ferment on the third day, at ordinary temperature, and not in sunlight, and proceeded rapidly, giving off ill-smelling gases and developing the spores and rods which are associated with organic putrefaction, and which (or the fluid which nourishes them) are agents in inducing septic change or disease.

Now how were these men exposed to danger from this source? In the first place, this water was used to wash dishes and cooking utensils when the camp was first established, and probably vegetables at some time or other afterwards, and might have been used in making coffee, especially on the last day, when these twenty men ate separately, as they had to start earlier than the rest, or on the day of their arrival, when they ate separately. No amount of boiling will destroy the vegetable spores described above. They are indestructible at the temperature of boiling water.

This water when used was brought up in a large tin wash-boiler, which was either used to make coffee or boil vegetables—two were in use. The target-range for small arms for these men was across this pond, which brought them every day in its immediate vicinity, and to its very borders, and it is more than probable that some water was drunk. As to *appearance*, the water was as good as that in the barrels supplied to the camp, and often clearer.

But, granting that the water could produce disease, why was it typhoid? This question is easily answered. There was a case of typhoid in camp among the attendants, who had a not very well marked illness, which developed into a severe case of typhoid fever; who entered camp with malaise, and diarrhœa soon developed, remained in or about the camp until the disease was fully decided, thus furnishing the specific virus of typhoid fever, without which, many claim, no case ever occurs.

The causes predisposing these men to receive infection, supposing them to have been equally exposed as the others in camp, were, in the first place, their age. They were younger men than Co. E. for example, ranging from 18 to 30, but seven over 30, while there were none in Company E under 21, and most over 25. The average age of those sick was 21; of the dead, 19. In the second place, the fatigue of the march of twenty-four miles, and the exposures of the camp, which are, as is well known, best borne by men from towns, who take better care of themselves than men from the farm, especially young men. There is something, too, in habit, and these boys were not as well fitted to resist as those whose lives were passed for the most part in unhealthier surrounding than any they were exposed to at Niantic.

#### TYPHO-MALARIAL FEVER.

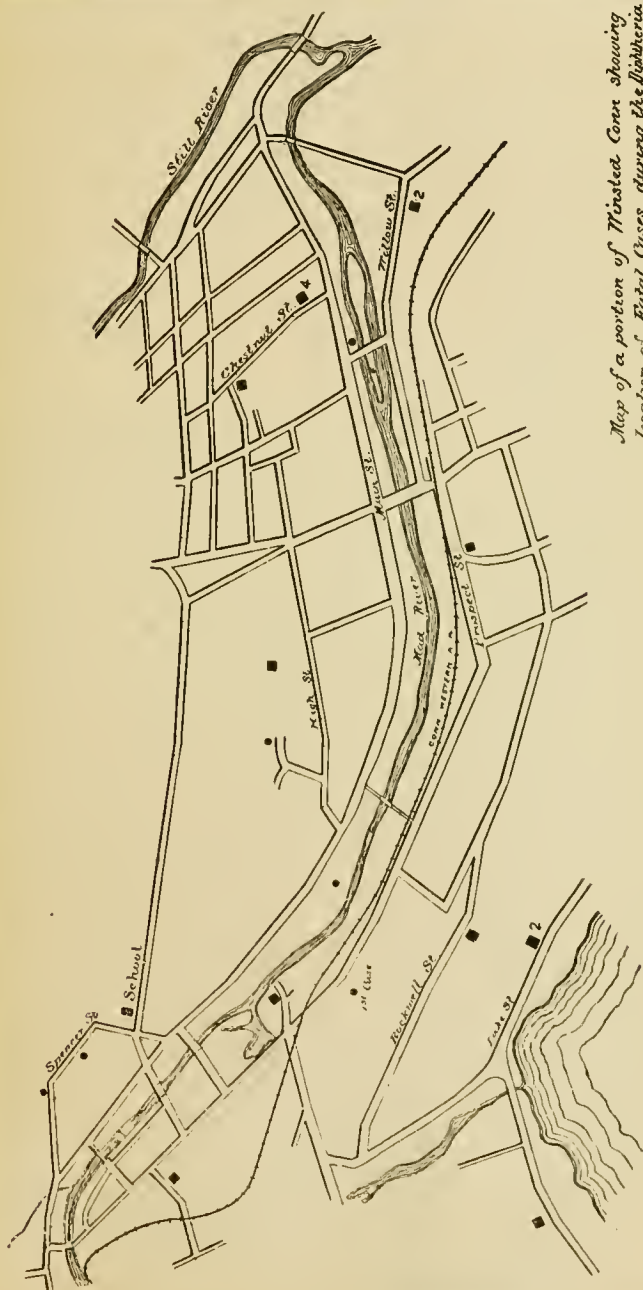
Typho-malarial fever, which first appears in the published mortality lists in 1877, has been quite frequent this year, though perhaps not epidemic, except in Hamden, and vicinity, where malarial fevers have attacked almost all the inhabitants of all ages, and have become endemic for several years. There were 12 deaths from typho-malarial this year in Hamden, and 9 in Derby. In Hartford, New Haven, Salisbury, and other places, it is reported as prevalent, and has been, judging from reports, more prevalent and over a wider area than last year. In Durham ten cases occurred near a large bush swamp of 50 acres, soon after it was drained. It is credited with 50 deaths against 28 last year, and has been more prevalent in New Haven and the southern portions of Fairfield counties. Malarial fever is reported as invading Norwich, Salisbury, Colchester, and some towns in Litchfield County, for the first time, that is, cases originating there.

## DIPHThERIA.

Diphtheria has shown a marked tendency to take on an epidemic form, to recur with increased severity, and to be accompanied by a large number of diphtheroid cases more or less severe. Children have been usually attacked, and the mortality has been almost entirely confined to them. In some instances the disease has clearly been introduced from without, and spread from one case, finally breaking out into an epidemic; in other cases it has apparently been sporadic, and due entirely to local unsanitary conditions. The history of these epidemics in towns shows conclusively that the duty of systematic attempts to protect the well from contagion is not yet fully recognized, or acted upon, nor the importance of thorough sanitary precautions.

WINSTED.—The disease was introduced, apparently, by a child upon its return from Massachusetts, where diphtheria had been prevalent, and was succeeded by several cases about a week after in the immediate vicinity. These were on high ground and clean surroundings, as reported. "The outbreak of the epidemic was simultaneous with an easterly storm extremely chilly and raw, producing an unusual feeling of depression. The time of the attack was about 10 or 12 days, after which sporadic cases occurred in badly drained houses, near stagnant pools, wet cellars, etc. The disease remained in this form for about two months, when, after another easterly storm, with a similarly depressing, chilly influence, another outburst of the disease as at first, attacking children who lived in dry, well-drained houses on elevated ground, and lasting for about 10 to 12 days and as suddenly subsiding. The disease has not been as malignant as it generally is, cases did not usually reach a fatal termination before the sixth to ninth day, and death occurred almost invariably from suffocation. Since the second outbreak there has been a very remarkable number of cases of spasmodic croup, all very tractable.

The borough of Winsted is about a mile and a half in length. The fatal cases have all been in the western portion of the town. A lively stream runs through the town from west to east, which receives the drainage from many houses. Both epidemics occurred in a tract a quarter by a half a mile, destroying in all seventeen children, average ages six to eight, and all but two under ten. This is the first fatal epidemic I have been called upon to contend with, during a residence of over thirty years. Usually



*Map of a portion of Minsted Conn showing  
location of Fatal Cases during the diphtheria  
epidemics of the fall of 1878*

two or three deaths would be about the average fatality from scarlet fever and the like.”—[Extract from letter of J. W. Bidwell, M.D.]

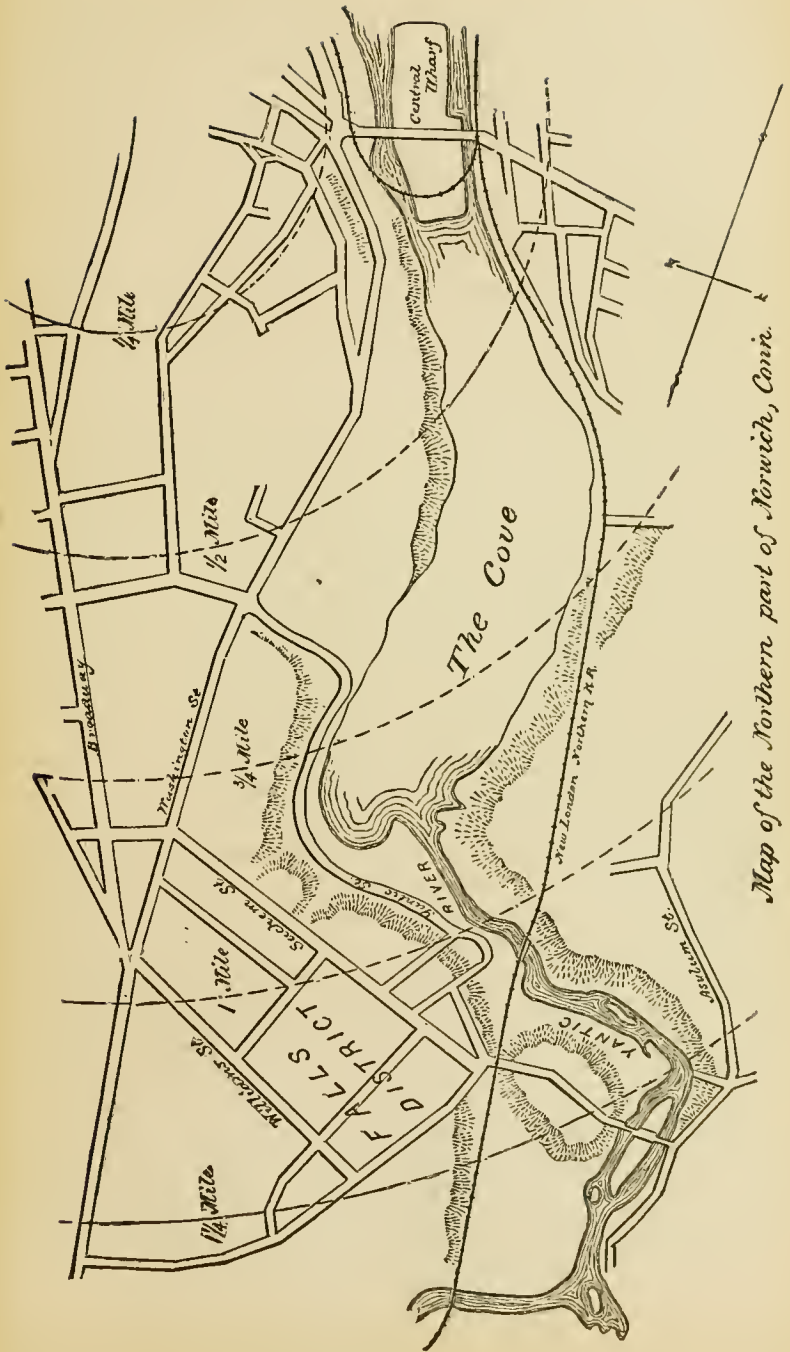
The above extract describes very graphically the epidemics in Winsted. The lingering of the disease where unsanitary conditions existed, and its marked tendency to recur, are noteworthy features. The effect of the easterly storms was no doubt depressing, as these are confessedly deleterious from their cold and chilling tendencies.

In the first epidemic there was but one fatal case in a house ; in the second there were more in several instances. On Chestnut street there were four fatal cases in one house. In the rear is a swamp hole with no means of drainage ; the sanitary surroundings in other respects were bad.

The accompanying map shows the location of the fatal cases ; a circle showing the first, a square the second, outbreak ; the numerals attached indicate the number of deaths where more than one occurred in a house. There were no fatal cases east of Chestnut street. The fatal cases only are marked : these were the centers about which the epidemic prevailed.

NORWICH.—Diphtheria appeared first the last of July in a tenement house belonging to the “ Falls Manufacturing Co.” The first case was fatal. Within two weeks there were five cases in the same house, confined to two of the four tenements. For a week or two there were no new cases. It then broke out afresh in the next house on the same side of the street, and at about the same time in a house directly opposite, both tenement houses. There were fourteen cases and two deaths. An aunt of the last child who died attended the funeral on Monday, and was taken with diphtheria on the Thursday following. She lived in a single cottage half a mile from the tenement houses, in a healthy locality. But few other cases have occurred in town. One was in one of the best families, in the healthiest and most aristocratic part of the town. The victim was a lady thirty-eight years old, of delicate constitution, and with slight tubercular deposits in the apices of the lungs. She was sick six days and died, apparently from paralysis of the heart. I am told that two other fatal cases presented the same appearance. This lady was teacher in a Sunday-school. Three of her scholars on their way to school stopped in to view the body of a playmate dead of malignant diphtheria, and there were other children very sick with the same disease in adjacent rooms of the house. These girls with their teacher and a few others also from





*Map of the Northern part of Norwich, Conn.*



this infected district, occupied a seat together for about one hour. A week after the teacher and the three girls were taken with diphtheria. One of the girls died and also their teacher. This illustrates how cases may arise "in the healthiest and best localities." All intercourse with infected places should be under control of the board of health, and all contagious diseases at once reported.

This district was somewhat isolated from the rest of the city, lying near the river and composed of tenement houses with a few cottages and double cottages. Renewed outbreaks, with about a week or ten days interval, occurred until October, at which time our investigation was made. There were long ranges of pig-pens in a not over clean condition; shallow privy vaults not over two to three feet deep; heaps of garbage and untrapped cesspools covered with several feet of earth, whose only ventilation was through the pipe leading into the house, the coarse gravelly soil rendering it not necessary to often clean them. The worst condition was found in one of the cottages, where a perfectly flat shelf of masonry was the only apology for a privy vault. A teacupful of fluid would run over upon the ground; hence the filth accumulated on the surface. To that was added the house garbage, and near by were the windows of the sleeping-rooms of the children. All the children had diphtheria severely, and three died. There were twelve deaths in a population not much exceeding two hundred, and many severe cases. The disease did not spread into the city to any great extent, and only when directly conveyed. The cases which are of a sporadic origin do not appear to have as great power of self-multiplication, but the disease seems to take on an epidemic character after having passed through one or two human systems. Thus, where the virus is conveyed to a new locality and allowed to smoulder, it more often bursts out in an epidemic form than where it arises apparently *de novo*. It would seem to gain more power and virulency, or perhaps more adaptability, to attack the human system by repeated transmission, like the vaccine virus that acts more forcibly one remove from the bovine, that is, after having passed through one human system. Careful disinfection was practiced in all the cases carried to other parts of the city.

In New Haven there was a localized epidemic associated with unventilated cesspools connected by untrapped pipes, unclean vaults, and similar unsanitary conditions. This was confined to one district, causing fifteen deaths in October, nine in November, and eleven from croup, probably diphtheritic. These were due to

neglect of well-known sanitary precautions, and emphasize the necessity of a sanitary inspector for tenement-houses, although these are not the only ones where there is gross negligence and its resultant of disease and death ; still their occupants are less able to protect themselves and more ignorant of the need.

Diphtheria has also been epidemic in Woodstock, from whence it was probably introduced into the neighboring town of Eastford.

The first case in Woodstock valley occurred the latter part of July in a girl aged thirteen, who was not attended by a physician, but by report, the local trouble was severe. In front of the house there is a small mill-pond which had run nearly dry for some time previous, and the general sanitary conditions around the house indicated carelessness and neglect. The second case resulted from direct exposure to this, and occurred in a neighboring house about a week later. The sanitary surroundings of this house were good. The next three cases were in the same family. The disease soon became epidemic, spreading from this as a center, and was accompanied by a large number of diphtheroid cases. Children under twelve were generally the only ones attacked. There were two deaths and, including diphtheroid cases, thirty-five cases. A common sanitary defect was found in connection with the sink-drains, most of which opened a foot or two from the house, with shallow pools and damp, filth-saturated soil.

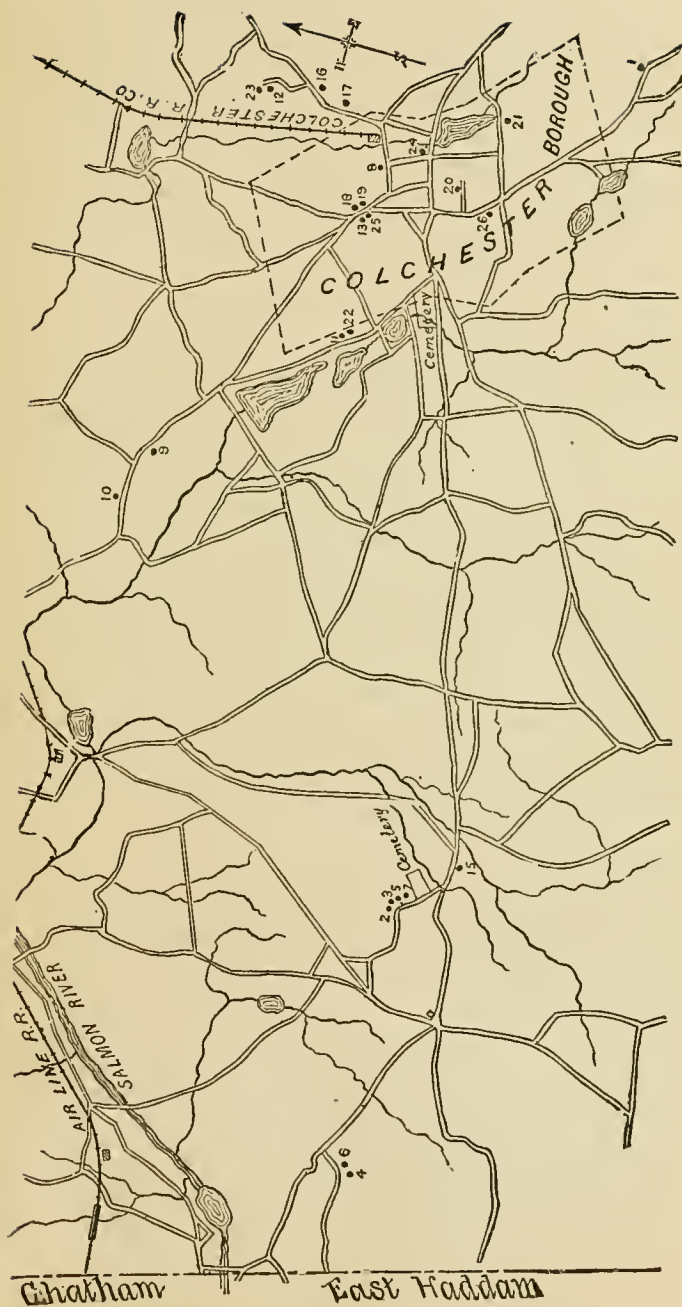
The disease has been very prevalent in Colchester and vicinity. Our correspondent writes that it first appeared August 3d ; it rapidly took on an epidemic form, and was attended with a great number of diphtheroid cases, all but one children from five to eleven years. Infants have rarely had it, nor adults—but one case known. Three deaths occurred after the danger was supposed to be over. The relapse in these cases was sudden, and death ensued within twenty-four hours. These cases were among the most severe form of the disease, where the growth of the membrane had been very extensive. The following facts are suggestive. In one house there were four fatal cases of diphtheria. The first cases were here, and at the first outbreak, in August, two children died, one within two days, the other three days after seizure. In October the disease reappeared here with two fatal cases and the same duration. The house referred to above was occupied by a washerwoman, and all the waste water and kitchen slops were, from a defect in the sink, thrown out of a back window. The house was upon a hill-side, and the slope of the land caused the

waste water to run down through the cellar wall into the cellar, so making a cesspool out of it. The two younger children first succumbed. It is probable that here was the focus for the epidemic, as the cases of sore throat preceding were, even if diphtheritic, not malignant. In a total mortality of sixty-four, from all causes, there were twenty fatal cases of diphtheria, a little over thirty per cent. In August there were two deaths, in October ten, in December five, and one each in September and November. The accompanying diagram shows the location of the fatal and severe cases.

In Eastford there have been about twenty cases and three deaths. There had been no cases there before for twenty years, and had the first case been thoroughly isolated and the surroundings disinfected, the disease might have been arrested. The disease was introduced from without, the second cases were in a neighboring house within ten days after, and were much more severe, two fatal. The disease then spread rapidly through the village, accompanied by the usual diphtheroid cases. As it is a new disease in that region, diligent care is necessary in disinfecting to prevent its securing a permanent foothold.

In North Stonington diphtheria prevailed extensively, with the usual number of diphtheroid cases ; a considerable percentage of the cases were characterized by gross negligence of all sanitary considerations. The disease appeared to be sporadic, and originated under the conditions above alluded to. There were nineteen deaths reported, all of children. There were twenty-four deaths during the year from zymotic diseases, fifty per cent. of the total mortality in that town, and equal to the whole number of deaths reported in 1877. In one house there were four cases, two of which died within twelve hours after seizure. The neglect of the ordinary laws of health and disease may continue for a long time with impunity, but the retribution is terrible when it does come. The neglected hovels of the poor and degraded often furnish prolific nurseries of death.

The cases in a family in Granby illustrate the retention of the contagion. The family (colored) lived in a miserable, filthy hovel, and in the spring of 1878 the father and several others of the family died of diphtheria. On the approach of very cold weather the bedding then used was brought into requisition again, when the disease reappeared, attacking successively the whole family and taking off two out of the three remaining. As the hut was isolated and there was little or no communication with neighbors, the disease did not



spread extensively. There were four deaths in one family in East Granby near by caused directly by contagion from these.

The method of the transmission of this disease and the theory of its increased virulence by successive transmissions were well illustrated in a series of cases in New Haven county, as reported by the physician in charge. A lady visitor from a region where diphtheria had been prevalent, had herself a mild attack of sore throat, hardly requiring treatment. About a week after her arrival three of the children were attacked, and one died. All the adults of the family were more or less severely attacked. One of them meanwhile had left for a visit to a neighboring town, and was there attacked. After the usual period of incubation the children of the family were seized with diphtheria, and one died. The disease then attacked the adults, with one fatal result. This series of cases was very carefully studied by a very intelligent observer; the houses were in an unusually good sanitary condition, and all other probable causes of contagion were considered.

One form of this disease that has been prevalent in this State seems not to be the malignant, contagious form that is sometimes encountered. The slight comparative mortality is noticeable. A false variety of diphtheria, or at least a mild form, has been very prevalent in certain parts of England, which this variety very closely resembles. The following are its distinctive features:

1. The disease is to a great extent confined to the tonsils, sometimes invading the glands of the neck, and although yellowish-brownish spots are seen, there is no tough leathery membrane.

2. The patients are anæmic, have no albuminuria, pulse usually full, average duration ten days. It is communicable, but not very contagious.

3. It is seldom fatal, and is not followed by paralysis.

It is essentially a filth disease, always associated with some organic impurity of air or water, and saturation of the soil around dwellings with slop water.

There is often a prevalence of sore throats of a non-infectious nature before an outbreak of diphtheria. Some who accept the germ theory of disease believe that an already existing organism may take on an infectious character, and in that manner explain the origin of typhoid fever, diphtheria, and the like, from unsanitary conditions, without the specific virus from a preceding case. Whether these mild cases can lead up to diphtheria or not, it



seems that the virus of diphtheria gains new strength, malignancy, and infective power by passing through a human organism, just as the most vigorous vaccine virus is that one remove from the bovine; that is, that which has passed through one human system.

#### SANITARY REPORTS FROM CITIES AND TOWNS.

The following are selected from reports received. These when complete from all parts of the State will form the basis for some general conclusions, and a tabulated report:

##### BRIDGEPORT—DR. N. E. WORDEN.

The population of the town by the last census, that of 1870, was 19,076. Since that time additions of territory have been made, and the parts just beyond the boundaries, attended in sickness by Bridgeport physicians, and reaping all the benefits of the town's people, have greatly increased in numbers. Good judges estimate the present population, including the annexed portion and West Stratford, at about 25,000.

There are no statistics available by which the number of nationalities represented can be ascertained, but from my own knowledge, I can mention the following: Irish, German, African, English, Scotch, Hebrew, frequent in the order named, so far as I can judge. Besides these, there are French, Italian, Swede, Swiss, and Norwegian.

The manufactures and trades are varied. There are upwards of 120 of all kinds, the largest being the well-known Sewing Machine establishments of Mr. Wheeler, and the late Elias Howe.

The employés of these factories live distributed in all parts of the city, an undue proportion of them, however, living in what is called the Eastern district. Most of the houses there are small, and built for tenements. Their surroundings are not such as wealth and intelligence might procure, nor is that portion of the city as well provided with sewerage as it should be, or as its more influential neighbor, the main portion of the city. Indeed many glaring violations of hygienic laws are here noticed, such as privies heaped full, cess-pools emptied out on the ground, and both in close proximity to wells which supply several families with drinking water. These causes must of course have to do with the health of the employés, as it deals with the general health. But there are special liabilities to incur certain diseases in some of



these establishments, as in the hat factory, where dyes are used, and where the fumes of chlorine are constantly being given forth, together with the great heat and the particles of wool flying about. All of these tend to cause irritation in the air passages, and to produce pulmonary diseases. In the foundries the intense heat and the violent labor required would seem to have a tendency to cause disturbances of the circulation, leading to hypertrophy or other organic diseases of the heart. The factories themselves are kept clean, and are all provided with means for full ventilation. My attention has recently been called to the frequency of pulmonary consumption among those following the profession of dentistry. A number living in this city have died of this disease, among their number several who seem to have had no inherited tendency. This may perhaps be explained by the confinements which the business compels, the cramped position in operating, and the being obliged to inhale the breath of the patients—breath which is sometimes diseased, many times foul. I think this is a subject worthy the study of the medical fraternity.

The soil of Bridgeport is at bottom sand, overlaid with clay, and topped with a rich layer of loam. Toward the north are outcroppings of trap rock in abundance, the result of upheavals. There are no geological formations of especial interest in the immediate neighborhood. The southern coast bordering the sound is low and consists for the most part of salt marshes. Numerous springs and streams flowing through, give an abundant water supply, while wells can be dug almost anywhere at a depth varying from fifteen to fifty feet.

Private enterprise has not directed its attention to the subject of artificial drainage. The city has provided well for what lies within its jurisdiction, curb and gutter having been laid almost wherever streets have been opened, thus forming an exit for the surface water. The town in the rural districts contains many acres of swamp land unimproved, which good drainage and cultivation would cause to bud and blossom. I question whether the reclamation of wastes like these does not stir up the poison of malaria.

The natural drainage has already been spoken of. The formation of the land is admirably adapted for such a purpose. Sloping as it does from north to south, the discharge of surface water is very complete. The Pequonnock river intersects the town, dividing the city into the eastern and western districts, receiving

the waste and sewerage, and discharging it into the waters of the sound. Indenting the coast are numerous creeks, admitting the tide water. The channels of these are narrowed, compelling a swift movement of the water at ebb and flow. Consequently the banks are exposed to the sun and air most of the time. If these streams should be made a deposit for refuse to any extent, it is quite certain that such *débris*, left upon the banks, would breed disease by the consequent decomposition. Such result has not yet occurred. Perhaps the healthy condition of our city is owing, more than has been thought, to the natural advantages of its drainage.

Within the limits of the town are numerous ponds of water, either natural or artificial, but in all of them the water has so much motion as scarcely to permit them to be called stagnant. The ponds called Pembroke Lake and Stillman's Pond on the northeastern boundary, approach as near to a condition of stagnation perhaps as any. This is a slowly running stream, which, alternately widening and narrowing, forms a series of ponds, extending from north to south, until it finally reaches tide water. At its juncture with the sound, a bridge with tide gates has been built for mill purposes, thus preventing a free flow. A turnpike with narrow culvert has been built within a few years, and the railroad crossing with its culvert forms still another interruption. It is a noticeable fact that the first cases of malaria occurring in this town were found along the upper borders of this stream. People living along the banks of this body of water, are still grievously troubled with malaria, and the affliction is said to have increased since the building of the turnpike and culvert before mentioned.

The southern border of the town is indented with numerous creeks, the banks of which are covered with a growth of coarse sedge and salt grass. The beds of these streams when thoroughly dug out will form channels for commerce and traffic by water, for these places are destined to be the sites of manufactories. The tide in these creeks runs rapidly, and the water is quickly emptied, leaving the muddy banks dry and exposed to the sun for many hours out of the twenty-four. Attention ought to be paid to these places now, lest they be made the deposits of refuse and garbage, which, left exposed to the sun, shall become nuclei of disease. Some of the ponds supplied by fresh water streams, are diminished in volume, and the banks left dry by failure of supply owing to

the drying up of the streams in summer. This is particularly the case with the large mill pond near the cemetery in the northeastern part of the town. An artificial pond, made for the sole purpose of gathering ice, has been made, toward the northern boundary of of the town, by the side of the road formerly called Division street. This pond is flooded only during the winter, at other time being a marshy tract through which flows a small stream.

The city is well supplied with sewers which run through all the principal streets, at sufficient depths, and of size large enough (with few exceptions) to carry away all the surface water. On March 1, 1874, there were 84,162½ feet of sewer mains. There have been added up to July, 1878, 16,491½ feet, making in all 19.06 miles of sewer mains.

The sewers empty for the most part into the harbor, all of them discharge their contents into tide water. On the south side the creeks will receive the contents.

The sources of water supply are the city water works and wells, principally the former, and the supply is abundant. Its source is the various streams to the north, which have been turned so as to flow into the receiving reservoirs. These latter are large artificial lakes made by damming a narrow passway in the course of some stream, the trees in the space to be flooded having been previously felled. There is consequently considerable débris always floating in the water. These reservoirs are situated in the town of Trumbull. In case of a scant supply in summer, water is pumped into the receiving reservoir from the large pond before referred to in the Pequonnock river at North Bridgeport.

The water of the wells is mostly hard, being impregnated with lime.

The wells are shallow, springs being found at little depth. Hence these wells are often reservoirs for the drainage of the ground immediately adjacent, forming perhaps the whole of the yard. In this portion will most always be found a privy; often a cesspool, both full, and in many cases a stable in addition. For the houses are not connected with the sewers, and the old-fashioned cesspool catches all the waste. The drainage from all these flows into the well which supplies drinking water for the household. This condition exists to a fearful extent in the eastern district and the western part of Golden Hill, where the poorer class of people live. Oftentimes the contents of the cesspool are emptied upon the bare ground, and are left to disappear by absorption or by evaporation.

I do not think there is a cistern used for drinking water in the city, nor do I believe there is a cistern supplied with a filter.

"Garbage and offal," by Chapter XV of the City Ordinances, is "declared to mean only such refuse matter as accumulates in the preparation of food for the table." The city is divided into garbage districts, of which there are three, and the removal of the refuse is done by contract. Much of it, however, is disposed of independently by private means. The city ordinance concerning the removal of garbage is not well observed. The scrapings of the streets and the contents of the sewer wells are carried through the streets in a cart which leaves its droppings along the road, and what is left is dumped upon the common grounds near the approaches to two of our most traveled bridges, and are utilized in filling up low ground; the practice is questionable in its sanitary relations. Our city authorities are much to blame for allowing dumping grounds in places so within the business limits.

There is a local health organization provided for in Chapter XIV, City Ordinances. It consists of the mayor and aldermen, who may appoint a clerk.\*

The number of paupers is estimated at about 1,200. There are about three hundred heads of families with an average of about four to each family. Of these there are about seventy-five constantly at the town house, deriving their entire support thence. The remainder are helped in part at their homes in different parts of the town. The town farm consists of forty-two acres of land near North Bridgeport, on which is the almshouse, a fine brick structure, with proper buildings adjoining. The contract system prevails in the provision for the poor.

There are no public institutions for charity. The Orphan Asylum, erected by the efforts of patriotic ladies during the war, has become now the child of the city, and is supported by private benevolence. Besides the orphans of soldiers, who will soon have grown beyond the need of any asylum, such children are received as are given up by their parents to its care.

The only public institution of correction is the county jail, in the northern part of the city. The building is new, of brick, and with all requirements and modern improvements. The average number of prisoners is about sixty, a larger number during the

---

\* An ordinance creating a new Health Board has since been passed.

winter months. The institution is well kept, and no death has occurred there of a person taken sick within its limits since the present structure has been erected.

The principal disease is malaria. The most frequent cause of death is diphtheria, the mortuary list showing between seventy and eighty deaths from this cause annually. Third on the list (consumption coming between) is disease of the heart, pneumonia following. The climate seems more particularly to develop diseases of the respiratory organs.

The accompanying map shows the location of the fatal cases of diphtheria in 1877 and 1878.

The principal source of danger to life and health is our inefficient Board of Health, for all hygienic laws are openly violated without rebuke. Next are the shallow wells in proximity to full privies and unemptied cesspools.

The registration laws are very poorly observed. Returns of births and deaths are made but once a year. Physicians are remiss. In one case no returns could be obtained until the clerk made it out.

Improvements most needed are, that connections should be compelled between houses and sewers, especially where the dwellings are in blocks or flats, with plumbing under the supervision of the health officer, and the abolishment of privies. That part of the course of the Pequonnock river between the dam at the pond alluded to and the head-waters of Berkshire pond is a broad expanse of lowland, covered with a growth of stunted trees. The region is infested with malaria, and at the present time it is the only place in which diphtheria is prevalent. The course of the stream ought to be narrowed, and the whole space filled in.

For a proper registration of vital statistics, an enforcement of the laws for that purpose provided is necessary.

Illumination is supplied by the Bridgeport Gas Light Company, a chartered corporation. On the outskirts, gasoline is used, with self-feeding lamps.

#### NORWICH—DR. C. M. CARLTON, REPORTER.

The population, estimated at 16,500, is composed, in addition to the Americans, of Irish, German, English, French, and Scotch, and about three thousand live in tenement-houses. Pulmonary diseases amongst the operatives in the cotton and woolen mills are



MAP OF  
*Bridgeport, Conn.*  
 Showing *Hephaerine* Epidemics of 1877-8.  
 1877 •  
 1878 ■





very prevalent. Most of them live in cottages and tenement-houses. Rockwell pond, and both Yantic and Shetucket rivers are partially dry during the summer, and the river bed in places offensive from the outhouses on its banks. The area drained by sewers is about eighty acres, and there are about three miles of sewers which empty into the rivers. The dumping-ground is Yantic Cove, which is to be filled in this manner. In some cases there are cesspools which seldom require cleaning, as the soil is gravelly and porous. Intermittent fever has appeared here this fall for the first time, except a few cases on the line of the New London & Northern Railroad, when that was built.

ELLINGTON—A. A. HYDE, REPORTER.

Estimated population 1,500; principal occupation, farming. The soil is a sandy loam, favorably situated for natural drainage. There are three hundred acres of marshy land which are constantly decreased by drainage, and when extensive ditching has been done malarial fevers have prevailed. The average depth of wells is twenty feet, the nearest privy to well fifteen feet, average distance of sink drain from well one rod. Prevalent diseases, *typhoid fever*, *typhoid-pneumonia*, *diphtheria*, *dysentery*.

COLLINGSVILLE—DR. G. R. SHEPARD, REPORTER.

Population, American, three-fourths; French Canadian, one-eighth; Germans, one-eighth; Irish, one-twenty-fourth; Swedes, one-twenty-fourth. The largest number of families living in a tenement-house is seven; average, four. The principal disease, due to occupation, is grinders' consumption, from the dust inhaled. The soil is gravelly. There are no sewers of any length; the principal drainage is by roadside gutters. The bed of the pond is exposed by day and fills up again at night to a very great extent in summer. The average depth of wells is twenty feet; filth is disposed of in heaps near the house. Malarial diseases, *dysentery* and *diarrhœa*, and of late *scarlet fever* and *diphtheria* have prevailed extensively. There is no local health board except the selectmen.

SUFFIELD—DR. J. K. MASON.

The principal occupations are farming, and the manufacture and sale of tobacco, the staple crop. The soil is clay or gravel naturally, well situated for drainage, with about three thousand

acres of low, wet land, and two hundred of swampy, marshy land; about four hundred acres have been drained during the last five years. The principal unsanitary conditions are wet and unclean cellars, foul wells, cisterns, sink-drains, and cesspools. The principal diseases are dysentery, pneumonia, consumption, typhoid and typho-malarial fevers. The water supply is from wells and cisterns, mostly hard. The average depth of wells, twenty-five feet; shallowest, eight feet, and the least distance of privy and sink-drain from well, fifteen feet and ten feet respectively.

WILLIMANTIC—DR. C. J. FOX.

The population is composed of Americans, Irish, and French. About two thousand live in tenement-houses; the same number in cottages, and a thousand in boarding-houses. The greatest number of families living in tenement-houses is eighteen; average, four. The principal diseases liable to occupation are those of the lungs. The principal manufacturies are sewing-cotton and silk. The soil is gravelly and naturally well drained. An area of 150 acres is drained by sewers. The wells range from sixteen to thirty feet in depth, and the water is pure, but generally hard. The garbage and house refuse is pretty promptly carted away to the neighboring farms. The principal sanitary evils are deficient and incomplete sewerage, and poor ventilation.

DERBY—DR. C. H. PINNEY.

Estimated population, ten thousand—one-half Americans, one-third Irish, remainder English and German. A very large proportion of the employés live in cottages. The drainage is excellent; there is no flat land; the soil sandy and gravelly. There are three water companies that supply this and adjacent villages, but many bring water to their houses from springs in the hills; the water is soft and clear. The house refuse and filth is removed by the river. There are no diseases directly due to occupation. The largest number of families in a tenement-house is twelve.

NAUGATUCK—H. C. BALDWIN.

The population of about 4,000 is composed of Americans, nearly half Irish, about one-third English and Germans, and a few French, and the employés are about equally divided among tenement-houses, boarding-houses, and cottages. The largest number

of families in a tenement-house is six. The principal manufactures are rubber, iron, cutlery, and woolen. Those that work in the cutlery shops are subject to grinders' consumption, and those in the rubber and woolen mills are more liable to diseases of the lungs. The natural drainage is excellent; the Naugatuck flows through the center, and there are no bodies of stagnant water. There is not sufficient care taken in summer to cleanse and deodorize privies and cesspools, and as the soil is very porous, the wells often near, they may become contaminated. Typhoid fever and malarial diseases are prevalent.

PLAINFIELD—REV. J. H. FELLOWS.

The principal occupations are farming and manufacturing cotton and woolen goods. The soil is sandy and favorable for drainage. There is but little wet and undrained land. Consumption is the principal cause of death. Typhoid and scarlet fevers prevail. Water is obtained from wells and springs, the former hard, latter soft. Some of the wells are but six feet deep; average, twenty; deepest, sixty. The least distance of privy from well is fifteen feet, of sink-drain, ten feet; average, twenty-five feet. The principal unsanitary causes arise from an insufficient supply of water and the conditions above described. A gradual form of paralysis is the only peculiar form of sickness I have noticed.

# SECOND ANNUAL REPORT

OF THE

# STATE BOARD OF HEALTH,

FOR THE

*Fiscal Year Ending November 30, 1879.*

---

Printed by Order of the Legislature.

---

HARTFORD, CONN.:

PRESS OF THE CASE, LOCKWOOD & BRAINARD COMPANY.

1879.



# State of Connecticut.

---

OFFICE OF THE  
SECRETARY OF THE STATE BOARD OF HEALTH,  
STATE HOUSE, HARTFORD, Dec., 1879.

*To His Excellency CHARLES B. ANDREWS, Governor of the State of Connecticut.*

SIR: In compliance with the laws of this State, I have the honor to present to you the accompanying report for the fiscal year ending November 30, 1879.

Very respectfully,

C. W. CHAMBERLAIN, M.D.,  
*Secretary of the State Board of Health.*



# MEMBERS OF THE BOARD.

JOHN S. BUTLER, M.D., President, Hartford,	Term expires. July, 1880
A. C. LIPPITT, New London,	" 1880
A. E. BURR, Hartford,	" 1882
R. HUBBARD, M.D., Bridgeport,	" 1882
C. A. LINDSLEY, M.D., New Haven,	" 1884
PROF. W. H. BREWER, New Haven,	" 1884
C. W. CHAMBERLAIN, M.D., Hartford, Secretary.	

## GENERAL REPORT.

---

The past year has brought forcibly to public attention the close connection between public health and material prosperity. The prostrating effects of a general epidemic upon the business of a city, and the influences checking growth and development, as well as the direct losses involved, have been plainly illustrated. The lessons derived from the wide-spread epidemic of the previous year were startlingly emphasized and enforced. The unsanitary condition of very many populous places, and the neglect of the laws of public health, as shown by the almost universal contamination of air, soil, and water, in all the places invaded, was evidently one of the most important causes in producing the epidemic of 1878, if not the producing agency. The outbreak of the fever in 1879 in Memphis, where the local conditions were undeniably worse than in the other southern cities, its localization there by quarantine, and the perfect control of repeated outbreaks in New Orleans by well-enforced sanitary measures, afford striking illustrations of sanitary laws, that pollution of the requisites for healthy life cannot proceed with impunity, as well as the power to prevent the outbreak of diseases that once developed cannot be controlled. The remark of Col. Waring at Nashville, "that yellow fever is, after all, one of our minor diseases," is significant. We hardly realize that unsanitary conditions in a quiet way destroy multitudes each year, while epidemics are infrequent, and the mortality, though strikingly impressive, is but slight in comparison to the waste of life from preventable diseases, the results of neglect of sanitary regulations. Consumption, diphtheria, scarlet fever, typhoid fever, and like diseases cause the needless loss of many lives, but they attract little attention, and the accumulations of filth continue to increase, unless some epidemic occur, and even then a partial recurrence may be required to induce action.

Yellow fever occurred in several places in this State in earlier years, and a few years ago there were four deaths from this dis-

ease in New London, from a ship that ran into that port to evade the quarantine at New York. One death was reported in 1878 from Stonington, from yellow fever, but on investigation it was found that the captain of the ship visited an infected port, was taken with yellow fever, died, and was buried at sea.

The Board were consulted by various local health organizations with reference to refugees from Memphis, and in several instances where carpets and bedding had been used in connection with yellow fever cases in 1878, it was recommended that these goods lie unpacked until winter, and be then disinfected and aerated. This course was pursued in regard to unpacking the goods, which were stored until the winter months. There were quite a number of refugees in Connecticut from Memphis.

#### THE IMPORTATION OF RAGS.

New Haven is the only port in this country that receives whole cargoes of rags. These come for the most part from Egypt—the companies have an agent there and extensive shipments are made. The principal garment of a large part of the population is a long cotton robe reaching from head to feet nearly, hence cotton rags are abundant. These rags are torn up and pressed into bales at Alexandria. Upon the outbreak of the Oriental plague fears were entertained lest the disease might be imported through the medium of these rags. The companies were conferred with, and orders given that no further collections be made from the infected region or southern Russia. The port of New Haven was visited, and it was there ascertained that, owing to the time required for the trip, the cargoes of the vessels under way and loading must have been collected before the outbreak of the plague. The subject was brought to the attention of the National Board of Health, which issued an order relating to the disinfection of cargoes from infected ports. Similar action was taken by the quarantine authorities in Great Britain. If disease could be conveyed in this manner, the danger would be where the bales are opened at the paper mills, as the rags are imported in closely pressed bales. The health of the sailors on these vessels was investigated, and no cases of sickness discovered while in port, and apparently none at sea. The reports generally from the manufactories in this State show that small-pox is the only disease that has been communicated by rags, and that from domestic rags in a few instances; the law obliges all operatives in paper mills to be vaccinated, and it is recom-

mended to mill overseers that the law be strictly enforced. The British government appointed a commission to investigate the transmission of disease by rags, and as a result of inspection of the principal mills in England, and the records for a long period, extending over twenty years, no other disease than small-pox was found to have been communicated, that is as in this country, no other epidemic contagious disease. Of necessity, researches on other forms would be incomplete, uncertain, and unsatisfactory.

#### SCARLET FEVER IN THE ORPHAN ASYLUM.

A few years ago there was a rather mild epidemic of scarlet fever in the Hartford Orphan Asylum, then occupying its old quarters on Washington street. The type of the disease was not particularly severe, but every child that was admitted subsequently had scarlet fever, but no other cases developed from these, although all the inmates did not have the fever in the first instance. It was considered an undesirable state of things to continue, and the aid of the Board of Health was invoked. It was directed that all the articles of bedding, carpets, curtains, and woollen articles generally that had in any way been connected with cases of scarlet fever be brought into one room and disinfected by burning sulphur, and specific directions were given as to the quantity to be used for a room of a given size. The iron and wood-work of the furniture was ordered to be repainted after disinfection, the woollen articles to be thoroughly aerated. These directions were well carried out and no further cases of scarlet fever occurred, neither was the disease transmitted to the new building where the asylum was in a few months afterwards removed. Several admissions had meanwhile taken place. The inmates slept in large dormitories which were then frequently white-washed, so that no infection would be liable to linger in the walls, but apparently in the bedding.

#### PROMINENT FORMS OF DISEASE.

The general health of the State during the year 1879 has apparently been for the most part satisfactory. Malarial diseases have been decidedly prevalent, involving new territory at apparently a pretty uniform rate. Some discussion of malarial fevers in the Quinnipiac valley will be found in the special reports. The fatal forms are congestive fevers, typho-malarial, and bilious remittent. The ill effects of malarial diseases are not to be estimated alone by the death rate, as the proportion of fatal cases is slight.

The number of acute cases does not, when also included, entirely cover the case, as these diseases readily become chronic, tend to recur and linger, preceded and followed by a period of malaise that interferes to a great degree with health and comfort, and also lessens very materially the working capacity, and the hours that can be spent in labor. Their effects are seen also in other diseases, persistent enlargement of the liver and spleen, malarial rheumatism, and a peculiar form of spinal tenderness; indeed, the connection between malarial disease and cerebro-spinal meningitis, at least so far as localities are concerned, is a close one. A tendency to pelvic congestion is also reported, and trouble in obstetrical cases from the depression induced.

The relation of drainage to malarial diseases, and the influence of local causes,—soil saturation and retained moisture,—to the production of malaria, are becoming better understood. It is only comparatively lately that the importance of systematic drainage for health has begun to be realized. In our own State, largely through the influence of this Board, extensive drainage for the removal of malarial disease has been undertaken. The experience of Michigan, New Jersey, and other States and countries, affords every encouragement. Careful study will doubtless reveal removable causes wherever malarial diseases exist generally or locally; the connection between subsoil or ground water and their prevalence will in many instances furnish the explanation of otherwise apparently obscure cases. In another connection this subject is further treated, and a full discussion of drainage for health is hoped for by the time our next report is ready, and accurate data have been secured. While railroads, dams, and embankments are in process of construction, cities and towns occupying new territory for building purposes, and the grading of grounds and roadways extensively carried on, natural water courses receive but little attention, nor in constructing sewers in cities has there been attention enough paid to the natural drainage ways. The influences of this neglect have been more closely studied in New York city than elsewhere, and the close connection between the retention of ground-water from obstructed water courses malaria and cerebro-spinal meningitis especially have been repeatedly shown.

Typhoid fever has been for many years a prominent disease in this State. Its recurrence this year in Hartford after comparative infrequency is a significant fact in connection with the renewed use of the river water for drinking. There seems to have been a

steady increase in both typhoid and typho-malarial fevers since the epidemic of diarrheal disease in the fall of 1878. The river water, while freed from direct sewage contamination here, receives the sewage of Springfield, and is by far inferior to the West Hartford supply. A comparison with other waters used for public supply is here given:

	Conn. Riv.	N.Haven supply.	Boston supply.	Thames, London, Wells. Eng.	
Total solids (gr. per gall.),	4.200	3.300	not	5.700	19.600
Volatile, below red heat (gr. per gall.),	1.500		giv-	0.000	00.008
Chlorine (gr. per gall.),	trace.	0.220	en.	0.060	00.088
Free Ammonia (parts per million),	0.014	0.008	0.004	0.001	00.000
Albuminoid Ammonia (parts per mill.),	0.030	0.020	0.015	0.005	00.008

A trace of organic impurity is indicated by the albuminoid ammonia. The absence of chlorides in the specimen examined is singular, and must have been accidental. It is hoped that after this year the river will not again have to be resorted to for drinking water. Among the cities of the State, Meriden has one of the best sources of water supply,—upland surface water from an uninhabited, uncultivated water-shed, and abundant as to quantity.

Typhoid fever does not prevail extensively in well-sewered towns with a pure water supply, and the close, if not causal relation of contaminated water to typhoid fever and diarrheal diseases is so marked as to lead to an examination of the water in seeking for their cause. When entering the system through this medium, about one-third the time is required to produce the disease than in the case when through the medium of the air. It is a disgusting fact that excrement is allowed to gain access to air or water and is again taken into the system; yet typhoid fever, dysentery, cholera, and the like, are disseminated in this manner. The dejections of a typhoid fever patient thrown into a vault may preserve the specific virus or germs of typhoid fever, whichever it may be, for years if the vault be uncleaned, and then they may enkindle the disease. Experiments have proven the vitality of the germs of diphtheria for at least three years. The importance of disinfecting the dejections of typhoid patients cannot be too strongly urged. The duty of prevention of the possibility of future infection should be recognized. Copperas solution, the salts of zinc, or the dry earth system will secure this result. Indeed, both typhoid and enteric fevers are largely due to excremental contamination of air, earth, or water.

Diphtheria has not been developed in epidemic form so frequently



as in 1878, but the instances of whole families of children destroyed by it are by far too frequent. The circular of the Board has been pretty well distributed, is often now called for, and apparently has been very serviceable. Separation, even at short distances, of the uninfected, careful isolation of the sick, systematic ventilation and disinfection, as there recommended, will do much to limit the disease. It still remains endemic in Bridgeport, but much more decided sanitary measures must be enforced there before zymotic diseases become infrequent.

Consumption is still the most fatal scourge in this State: 1,316 deaths are reported as due to this cause, the greater number between the ages of twenty and thirty, at the most efficient period of life it also renders life less efficient and useful, lessening the vital powers and endurance. Careful investigation has shown that 24 per cent. only of the cases of this disease are due to inheritance;\* the remainder are the resultants of the direct violation of sanitary laws, for instance, dwelling upon damp, undrained sites. Houses frequently can be shown that have never had permanently healthy occupants, and too often the house and its surroundings cause that disease that is attributed to inherited tendencies. Another most prolific cause is breathing impure devitalized air, re-breathing air that has been deprived of its life-giving principles by repeated passage through the lungs; each time 5 per cent. of oxygen is replaced by as much carbonic acid. It must also be remembered that one contaminates more air than he breathes by the animal vapors, products of decay he breathes into the air, and by the exhalations from the skin. The foundations too often are laid in the devitalized air of the house contaminated by the gases of decay drawn in from a filth-saturated ground-air, resulting from retained excretions, and waste incident to house life, from the decaying vegetables and neglected filth of a damp cellar; and sleeping at night in small unventilated chambers. The process is hastened by the like conditions in the crowded school-room; with its sharp alternations from heat to cold. And if the dust-laden air of factory or workshop be superadded, the termination is soon reached. The greater proportion of cases among those whose occupations keep them indoors is a significant fact in this connection. Catarrhal troubles and lung fever are also induced by impure air. An epidemic of typhoid pneumonia was traced

---

\* Fox's Sanitary Examination of Air, Water, and Food.

during the year to bad sewerage, to which all those affected were exposed. Several of the cases were fatal.

There are many types of disease influenced by unsanitary conditions as well, and which can and will eventually be stamped out by efficient sanitation. It is gratifying to note that improvement follows the diffusion of knowledge, and that although opposition may at first be enkindled and indignant denial of the possibility of anything wrong existing, a calm, second thought induces action eventually.

The attention of the Board has, in several instances, been called to private nuisances, and instances where the unsanitary conditions maintained by neighbors caused trouble for those whose own affairs were well regulated. There seems considerable difficulty in dealing with a perverse neighbor in a country village who pollutes your well by a vault or cess-pool within a few feet of it, or even contaminates the air for a whole school by extensive pig pens or vaults, or induces malaria by damming the outlet of extensive swamp lands. Just how to meet these cases is not apparent. Some additional legislation is necessary, but just how to frame it is another matter.

#### SEWAGE DISPOSAL AND POLLUTION OF RIVERS.

These important subjects were brought to our consideration first by the application from the people of South Meriden and Yalesville, to investigate the pollution of Harbor brook and the Quinnipiac by sewage and manufacturing waste; and later, by the invitation from the Mayor, Common Council, and Health Board of Meriden, to inspect the city, and report its sanitary requirements. The general status of the principal questions involved is given here as far as they can be gathered from the sanitary publications of this and other countries. There is no general law with reference to sewage pollution of rivers in this country, and no other law in this State than special enactments concerning the preservation of the purity of waters used as a source of supply for towns or cities. A partial report was made to the legislature of 1878, with the draft of a law with especial reference to the use of rivers for drainage. The questions involved in the Meriden case, the disposal of sewage of inland towns, the use of rivers as outlets for sewage and drainage, are of such general importance that we have spared no effort in attempting their elucidation. We have secured maps of the basin of the Quinnipiac and of the topography of Meriden. It is hoped in time to secure accurate details of the topography of the whole State, as there

are many facts thus to be learned of the utmost importance in relation to the prevalence of disease. This question of the ultimate disposal of the sewage of Meriden, which is the principal one involved, although the drainage of the low-land is of no small importance, has been frequently and repeatedly discussed by the Board. The brooks in Meriden have been carefully traced as well as the course of the river, and several investigating committees have been over the ground in winter and summer. The local conditions in Hanover and Yalesville have also been carefully studied. Here several complicating elements come in. The river receives the manufacturing waste of the large cutlery works in Hanover. Many of the house lots in both villages are small, and the cesspools and vaults, either one or both, are in some cases not much over fifty feet from the wells, and the soil a few feet below the surface coarse gravel, then sand again. In several instances the cesspools were ventilated into the house only as described in our circular on house drainage. I have never yet failed to find illustrations of this wherever cesspools are in use to any extent: man can easily spoil a naturally healthy location. On the contrary, in other instances the utmost care and intelligence were manifested in the sanitary surroundings of the houses in Hanover and Yalesville, the two villages interested more especially in the use of the river. A careful survey of the wells in Hanover was made, and reference will be made later. This was done by an engineer employed by Hanover.

The best sanitary disposal of sewage is by irrigation, or by intermittent filtration and irrigation combined. The method of downward filtration is recommended because it is economical of land as well as efficient—but one acre required to three thousand inhabitants,\* and two or three acres used at a time, the land used every third year, so that practically one acre to a thousand inhabitants would be required. In Silesia, where there is a very extensive manufactory of beet root sugar and a scarcity of water, all water that has been used in the manufactory, and all waste and foul liquids, are discharged on a well-drained piece of ground, the filtered water collected in a well, and the clear pure water thus resulting is used in manufacturing sugar; the process is described by Liebig. This process is adapted for isolated dwellings, *i. e.*, intermittent downward filtration wherever small plots of land are available, and is by far preferable to cesspools; stored up accu-

---

\* Denton's Sanitary Engineering. page 61, *et passim*.

mulations of filth are an abomination. However it may be in regard to other sciences, the Bible taught true sanitary science, and for adaptation to their habits of life, the sanitary code given the Jews was perfect.

In intermittent filtration the sludge settles to the bottom of the furrows, then covers the sides, and after that new laud must be used; the sludge is allowed to partially dry and is then dug or plowed into the land, new furrows constructed, and the land ready for use. In Gennevilliers, near Paris (Paris sewage), these furrows are between the ridges of growing plants, and the sewage never directly touches the vegetation. "The soil acts mechanically as a filter, while the oxydizing action of the air on the soil and the growth of vegetation bring chemical agencies into operation, and decompose and assimilate the organic and other compounds in the sewage which may be available as fertilizing ingredients."

Frost does not materially interfere with the processes of irrigation or downward filtration; in the latter case the sewage sometimes thaws the land in the furrows if not frozen very solid. In winter the effluent water is slightly less pure, as there is no aid from vegetation. In the first description of the plan by Frankland in 1868, he states: A plot of five acres well and deeply drained (by porous tile) to the depth of six feet should be rendered as level as possible, divided into four plots and furrowed, each plot receiving the whole sewage for six hours. In this way, he states, the five acres would suffice for a town of 10,000 provided with water-closets. "Such a filter is a field for oxydizing and is analogous to respiration on an enormous scale, as the land gives out air to the filthy water trickling through it, and takes in air through the period of rest." The value of sewage for manure is estimated at two pence per ton by Denton.

Sub-irrigation is practiced successfully at Lenox, Mass., in this country, and sewage irrigation successfully at Worcester, Mass., at the Lunatic Asylum, so that the objection of the severity of our climate cannot be urged against either method, the one for isolated houses, small towns and villages, or the plan for inland cities. In Kendal, England, five and a half acres of land are used for the downward filtration of the sewage of fourteen thousand inhabitants—two million gallons in twenty-four hours. The plan has been satisfactorily in operation five years. Irrigation and filtration are in use in sixteen towns in England—precipitation in tanks at

Birmingham,\* precipitation by chemicals at Leeds and three other cities, the pail system at Halifax and Rochdale—from the latter place that system takes its name. Berlin, Paris, Dantzic, and other cities might be mentioned, where the irrigation system has been successfully in use, wholly or partially. The works for the city of Paris are made more extensive from time to time; ultimately it is hoped to remove sewage from the Seine altogether. By act of Parliament no new sewers can be constructed emptying directly into rivers. The committee which reported in 1876, of which Robert Rawlinson (the highest living sanitary authority) was chairman, state, among other conclusions,\* that “town sewage can best and most cheaply be disposed of and purified by the process of land irrigation for agricultural purposes. The sewerage of towns and draining of houses must be considered a prime necessity under all conditions and circumstances, so that the subsoil water may be lowered from wet districts and may be preserved from pollution, that waste water may be removed from houses without delay, and that the surfaces and channels of streets, yards, and courts may be preserved clean; that the existing modes of treating town sewage by deposition and by chemicals in tanks does not effect much change beyond the separation of the solids and the clarification of the liquid.”

There has been no further progress in this department, and this report represents the state of the subject in Great Britain, the most advanced country in the world in sanitary science and its application.

As stated elsewhere, Col. Waring, in his paper on the disposal of sewage, advocates the exclusion of surface or storm water from the sewers, and a separate system of drains for the subsoil water. There is much force in the objection to many of our sewers, as constructed with porous sides. If they will admit the entrance of the ground water, they will also allow the exit of the sewer water, and give a filth-reeking soil, besides polluting the ground water, always a prolific cause of disease.

In studying the Meriden case, the services of Col. Geo. E. Waring as sanitary engineer were secured, and the substance of his report will be found in the detailed report of our investigations. The plan of sub-irrigation has been mentioned as in use at Worcester and adapted to detached houses and small farms. In brief it is

---

\*See Report of Committee on treating town sewage, Local Government Board, London, 1876.



managed as follows: small drain-tiles are laid in a network a few inches below the surface of grass land, and the sewage conducted into them by a flush tank preferably. The latter is illustrated in our circular on house drainage.

#### STATE PRISON INVESTIGATION.

At the request of the directors, a committee was appointed to inspect the State Prison, and Prof. W. H. Brewer and Dr. Chamberlain were appointed by the Board. Three visits were made, and a report in writing submitted to the directors on certain definite and fixed questions which were asked us by them. This report was published by the directors. The final report of the chairman, Prof. Brewer, will be found among the special reports. The presence of insane convicts is to be deprecated, especially those completely demented, of which there are now a few at Wethersfield.

Several years ago a law was passed requiring the trustees at Middletown to receive insane convicts after a proper examination, which was specified, and a commission appointed. A commission was lately appointed by the Governor to examine as to the insanity of these convicts. This committee reported them to be insane, but they are still in the prison at Wethersfield, where no proper accommodations for their care exist. There are no regular provisions at Middletown for the care of insane convicts, and it would seem that altogether different provisions should be made for their care than for ordinary cases of insanity, and greater safeguards especially for those manifesting a homicidal disposition. Nor should they be mixed indiscriminately with other non-criminal insane, even when not of the dangerous class. A separate wing in the regular asylum for the insane, where might be confined all the insane that manifest a homicidal tendency, or the dangerous, and those difficult to treat from any cause, as recommended by the committee of the New Jersey State Board of Health, seems a most satisfactory, feasible, and reasonable plan. There does not seem to be any commendable system on this subject in any State in the Union. In Perth, Scotland, there is a criminal lunatic asylum.\* Here two classes of cases are found: 1st, Those found by the law insane at conviction. These can be detained as long as there is any danger of recurrence of the homicidal mania. 2d, Those

---

\* See Second Report New Jersey State Board of Health, page 34.



becoming insane after imprisonment. If fitted for an ordinary asylum they are transferred at the expiration of their sentence, otherwise they are detained at the criminal asylum at the discretion of its authorities.

#### IMPURE ICE.

Through the kindness of Dr. Orlando Brown of Washington, Litchfield county, under whose care many of the cases were, I am enabled to place on record the history of cases of disease resulting from impure ice. Through the agency of this Board, in several instances where large supplies of ice were cut from sewage-contaminated ponds or streams—indeed, so near to sources of contamination that it would seem no outside interference would be required—these sources have been abandoned, and purer supplies sought. No cases of disease were traced to the ice in the instances named, as the supply was so general throughout cities, but doubtless such cases did occur, and some of the apparently strange cases have been thus caused. However that may be, it is undesirable to use impure ice, and we are using all means to illustrate and enforce the fact that water is not purified by freezing when it contains any considerable amount of impurities. These cases are similar to the results published by Professors Wood and Sharples, in the Massachusetts reports, and of Dr. A. H. Nichols, in regard to the impure ice at Rye Beach and the epidemic that followed its use, published in the seventh report of the Massachusetts Board of Health.

#### DRAINAGE FOR HEALTH.

In our first report is published a portion of the correspondence with parties in the town of Fairfield, relative to drainage, and retention of ground water by the obstruction of natural water courses with the existence of extensive marshes, and the relation of this condition of affairs to the malaria prevalent there. A written report was afterwards sent, briefly stating the relation of malarial diseases to such conditions as were there found. A few months later, an invitation to deliver a public lecture was received by the Secretary, and in response, a lecture on drainage for health was delivered to a very appreciative audience. It was the intention to have shared the evening with Prof. Northrop, who had been written to at the suggestion of the Secretary, and to have proceeded to the formation of a Village Improvement Society then and there. Prof. N. was, however, at the White Mountains, so the

whole evening was occupied by the sanitary lecture; allusions only made to the value of organized effort for village improvement. The publications of the Board were freely supplied. As will be seen by the paper of Mr. Sturgis, to whose intelligent and whole-souled liberality this grand movement for public improvement is due, an organization was afterwards effected, and much has been already accomplished. This is the first instance, so far as I know, of extensive and systematic drainage for health that has occurred in this State, and it is a noble example to follow. The retention of the ground water was doubtless the cause of the prevalence of malaria in this "historic town," as there is no other cause for such a condition of affairs. The soil is naturally easily drained, if there be no obstruction. The only other unhygienic condition was much too dense shading by trees and ornamental shrubbery, inducing dampness of the soil. This can be readily obviated by thinning and trimming.

#### GLANDERS.

Several suspected cases of glanders were discovered in the City of Hartford, and the Commissioners on Diseases of Domestic Animals, Hon. E. H. Hyde and T. S. Gold, met with the Secretary of the State Board of Health, and the Chairman of the City Health Board, Dr. Noah Cressy of Amherst, Mass., a veterinary surgeon, called as an expert to examine the horses, reported five as unquestionably glandered. A valuable horse was killed by its owner, the disease having been communicated from these cases. The five horses were old, nearly worthless animals; they were all eventually killed. In France the skin is slashed to render it worthless, as the disease may be conveyed by the skin of the animal.

The keeping of such animals in the city was declared a public nuisance, as glanders is an incurable disease, and may be conveyed to man (a fatal case was soon after reported from Waterbury). It was advised that the horses be killed at once. All owners of horses were informed of the danger, if they possessed glandered horses, of loss to themselves, or in damages to others if they harbored the disease. By this prompt action a great deal of mischief was probably prevented, as the disease had commenced to spread. Horses that had been removed to the country to avoid detection were either hunted up and killed, or their owners brought so to realize the risks they were running that they voluntarily killed the affected animals at once. The importance of prompt and decided

action here is apparent. The disease more often appears at first in old, worn-out horses, where it runs a chronic course for many months; but if it attacks young, full-blooded animals, its course is much more acute and fatal. Such animals should be killed at once.

#### CORRESPONDENTS.

The number of correspondents of the Board has steadily increased, and their zeal and interest in the work have suffered no diminution. The amount of work done by them for the Board deserves our warmest gratitude. Their voluntary assistance has been of inestimable value, and the information conveyed of permanent interest. The registrars of the more populous places have our warmest thanks for the interest they have manifested in the execution of the laws, and the promptness of their mortality returns. Reports concerning the health of towns will be found in the appropriate place.

#### PUBLICATIONS.

The first two editions of the circular on diphtheria have been exhausted, and a third issued. Applications, indeed, have come in from all over the land, and single copies have been sent. The circular on restoration of the drowned proved very popular. Copies are in stock for a wider circulation when the bathing season recommences. It is issued in two forms, one for posting in public places, the other for the pocket memorandum book. The Board are indebted to the State Board of Health of Michigan for the circular and use of the plates. A compilation of the laws relating to marriage has been issued, and the registration laws will be contained in our annual report.

#### LIBRARY.

The inestimable value of the reference library already collected has been proven in multitudes of instances in answering the many calls for information on some special sanitary topics, from all classes, clergymen, teachers, physicians, and *mothers*, who take an especial interest in the work of the Board. This will, as a matter of course, increase in value each year. Only works of permanent value are purchased, but current exchanges and the scrap-book are of great value. Indeed, the newspaper cuttings fill a very important place that would otherwise remain unoccupied.

## MONTHLY MORTALITY AND SANITARY REPORTS.

These have from month to month grown more comprehensive, and apparently are attracting a wider circle of readers, as oftener, by far, questions concerning some statement contained in them are sent in. If our correspondents maintain their interest, which indeed seems on the increase, our reports must of necessity become more valuable as they include a wider area. Soon we can commence comparative statements.

## THE SEWERAGE OF NEW BRITAIN.

This subject was brought to our notice by the inhabitants of Newington, an adjacent town, who feared excessive contamination of one of the branches which form Little or Park river, which, flowing through Newington, joins another branch at West Hartford to form the river which flows through the Park in Hartford, and empties into the Connecticut at Dutch Point. As this river is one of the sanitary nuisances in its course through Hartford from the amount of sewage it receives, it was an interesting fact to learn that already over a third of the sewage of New Britain was discharged into one branch, and how far this was polluted was a question of interest. So far as New Britain is concerned, the system is an excellent one. Nearly all the sewers are to empty into one large trunk sewer, and a third or more of the city is sewered. A brook is turned into this main sewer, so that it is kept constantly flushed. The sewage is well mixed with water by the time it leaves the outlet of the main sewer, and the committee of the Board, Prof. Brewer and Dr. Chamberlain, found but little odor at the mouth of the sewer at midsummer. The course of the stream is such as to subject the water to constant aeration as it spreads out over shallow rapids or smooth pools along its course. Long before it leaves Newington all apparent trace of sewage contamination is lost, nor was there any decided contamination discoverable by analysis after three miles run along the tortuous, rapid stream. There is a large amount of vegetable growth along the banks and margins fringing the stream, which doubtless aids in removing any impurities.

## SOIL CONTAMINATION AND RESULTS.

This is a subject of the greatest importance, and the paper by Dr. C. A. Lindsley, Health Officer of New Haven, is one of the most

important that has been brought to the attention of the Board. The relation of contaminated excrement-sodden soil to the prevalence and indeed existence of many of the forms of disease that scourge us has never been so fully understood as of late. This contribution, to our knowledge, is well worth thoughtful study, as it is the result of careful attention and observation. The organization of the Health Board at New Haven is very efficient, and furnishes a good field for study upon sanitary topics, as well as for the accomplishment of good hygienic work. The results are seen in a city that has the lowest death rate for a seaport town of any city of the same size in the world.

#### SCHOOL HYGIENE.

A preliminary paper on this subject is furnished by the Secretary. Some aspects of the subject are presented, and a circular of information, hints on the hygiene of school houses, prepared for school committees and others who have to do with either the alteration of old buildings or the construction of new. Many of the schools in this State have been visited, and many buildings in other States. A complete survey of this State is intended before the final article on this topic is written.

#### SALE OF POISONS.

The attention of the Board has been forcibly directed of late to the desirability of some limit to the indiscriminate sale of poisons in this state, especially those generally used for criminal purposes. The most feasible expedient yet reached appears to be the registration by the druggist of the name and address of the purchaser, with any other identifying marks or circumstances that may occur to his attention. The mere fact that such a record is to be kept would act as a slight check. This should be confined to active poisons like the compounds of arsenic, strychnine, and the like, as the effect is weakened if a large list of unlikely agents be included. In a supplementary list discretion might be left to the druggist. We hope to have a bill in readiness for the present legislature.

## FUNCTIONS OF MODERN BOARDS OF HEALTH.

PROF. W. H. BREWER.

---

Other topics that have engaged the attention of the Board may be found in the special report of the secretary and in the papers on special subjects. The general scope and field of labor of a board of health is so well expressed by the paper of Prof. Brewer that it furnishes the best conclusion of this report that could be afforded.

Modern *Boards of Health* are the official organizations by and through which communities try to use the teachings of science for the prevention of disease. They have become a necessity, partly because of that large class of new dangers to health which have grown out of the changes wrought in our modes of business and life, and partly because of new applications of science. Our civilization has become more complex with the modern methods of doing business, particularly in the production and distribution of articles in common use by the masses, and one result of this change is that a man's safety from contagious disease is now relatively much less under his own control than when business methods were simpler. Even in his general health, he is now more liable to suffer for the sins of the community than he was when population was more sparse and before stock companies and other organizations supplied him with water and gas in his house, produced so many of his foods, drinks, and clothes, before steam transportation brought his food and other articles from so many and such distant regions, and before travel was so easy, speedy, and common.

These modern improvements, while beneficent as a whole, have introduced so many new sources of danger that they have made boards of health a necessity. So great is the necessity, that in many cities the rich and intelligent are organizing stock companies, societies, and associations for the protection of the members or stockholders from these new dangers, particularly against unwhole some adulterations of foods and drinks.



Official boards of health, taken as a whole, differ greatly in their constitution, organization, scope, and powers. Their aim is always the same—the furtherance of the public health. No other department seems more simple in theory, but as we find them in actual operation they differ more in their methods and scope than any other department of civil government. This is partly because of the newness of the subject, and partly because of the nature of the work they are asked to do.

It is well, therefore, that each locality for itself should often discuss this subject in the light of its own conditions and needs. In a case like our own, where a special board is a new thing, where its legal powers are still illy defined, and where its special and proper work is but imperfectly understood, it is particularly desirable that a discussion of its functions, methods, and uses be kept up until the community is educated into a better knowledge of sanitary science, and the board itself into a better understanding of the work it can do for that public whose servant it is.

The simplest form of a health board is the old one, devised in some previous century, and which still exists in this State at large, where its special functions, so far as they are performed at all, are performed by officers elected more especially for other duties, and rarely, if ever, chosen because of their having given special study to sanitary science. Such boards rarely perform active duties relating to the health of the public other than the most general and obvious one, unless on special occasions or emergencies, as, for example, when some disease becomes conspicuously epidemic, or small-pox occurs, or when unusually prevalent sickness is popularly attributed to some local cause. The efficiency of such boards is very variable. They have legal power enough, but usually lack the special knowledge required for good results. It sometimes happens that the work of such boards, in small communities, is reasonably efficient; more often they do nothing until an epidemic has set in, it may be not until after a panic has arisen, and then their work is wildly done, and without technical knowledge of what should be done. It is the attempt to use the pound of cure because the ounce of prevention has been neglected. Many a town, in recent epidemics, has found to their great cost how utterly inadequate to modern wants was a health board whose constitution and methods were devised long ago, for a smaller community, and before the modern methods of production, transportation, and travel were known.

It is just as wise for a modern city to rely upon the poor hand-pumps of the last century to suppress fires as on the last century's methods to suppress disease. If we are wiser in the protection of our property than of our health and lives, it is simply because a knowledge of mechanical science and invention is more widely diffused through the community than a knowledge of sanitary science and its applications.

The next step for the better is a separately constituted board to attend to this special want, and whose members are supposed to have a fitness for its especial work. But even here, we find still greater range of scope and operation than in the simpler board already described. The special board may be hampered by legal restrictions and uncertainties, or by lack of other municipal coöperation, or by popular or official ignorance and prejudice, or by a multitude of causes, not the least of which are the political customs of the community. Hence in one place it may be strictly confined to the prevention or suppression of epidemic and contagious diseases that are actually occurring, in another, in addition to this have more or less to do with the causes and sources of disease; next we find them collecting or classifying the vital statistics, because of the obvious relation between mortality and disease.

In other localities we find duties put upon them heretofore divided among other departments, such as the removal of garbage, the cleaning of streets and sewers, tenement-house supervision, inspection and more or less supervision of foods and drinks sold in the markets, the sale of poisons and medicines, the sanitary arrangements of schools, the supervision of unwholesome trades, and so on through a great variety of functions, and with plausible show of reason, because all of these things affect in some way the health of the community. How far this is sometimes carried is shown by a late order of the health board of a certain foreign city, prohibiting the ladies from dragging their trails in the public streets on the score of injury to the public health.

Now, it is for each city for itself to determine where, between these extremes, the functions of its own local board shall be placed, and that this be wisely done and for the best interests of its inhabitants, it is important that it be often and intelligently discussed.

Our own political principles and traditions have ever been so strongly in favor of the widest possible individual liberty, and so strongly repugnant to official supervision or control of private business, that it is difficult to introduce new restrictions or meas-

ures which the modern conditions make absolutely necessary for the protection of the public from some of the dangers of to-day as well as it was protected a generation ago under the conditions then existing.

Then one family's filth would not interfere with the health of its neighbors as it does now, because the neighbors were not so numerous nor so near. Then it was not so easy to introduce diseased meat, because we knew where the cattle were fattened, how they came here, and who slaughtered them; now the consumer practically knows nothing about it; and so on to the end of a long list.

Again, science has taught us how to cope with some of the diseases which were most dreaded in previous centuries, such as small-pox, cholera, typhoid fever, etc., but to successfully battle with them we must use organized effort and have official aid. Science has told us much about the nature of several of the most fatal diseases which sometimes sweep in great epidemics, how they march and spread, and what weapons can be used to vanquish or check them. When it is so universally acknowledged that the application of science has so added to our material prosperity, added to our comforts and our products, revolutionized our industrial pursuits, our commerce, and our travel, it is simply the height of foolishness not to use it also in the beneficent work of lessening sickness and saving human life.

Mechanical invention and physical science have contributed to the material good of the rich and poor alike; they have probably added relatively more to the privileges and common comforts of the poor than to the rich, yet it seems to me that they have relatively increased the *power* of the rich more than of the poor, and particularly to the power of rich organizations. It is probable also that these same causes have added to the credulity of the masses in directions dangerous to health. Such wonders have been actually performed that the claims of quacks and pretenders are listened to as they would not be were it not for the positive and well-known achievements of genuine science. An examination of all the advertisements of any single day in this city will show that nearly all of the manufacturers or vendors of nostrums claiming to cure all the ills of flesh, and also of new kinds of food and drinks intended for personal or family use, pretend to found their claims on the teachings and discoveries of science. There is nothing in the accepted ethics of publishing or in law to prevent

statements in advertisements which every intelligent man believes to be false, but which nevertheless deceive the ignorant, and who suffer as a consequence, sometimes directly from the use of the article, sometimes from a feeling of false security against real dangers.

It is most certainly the duty of government to protect the weak from the oppression of the strong, the virtuous from the vicious, and especially to protect that class called the poor. It is this last class that suffers most from adulterated foods, unwholesome surroundings, and other unsanitary conditions, which can only be controlled or suppressed by official effort.

The rich can largely protect themselves by voluntary association and by their wider choice of locality for their homes. As before said, in many cities private associations exist to protect its members from adulterated foods and drinks, and it is only a question of time how long it will be before each State or city must provide some official means to also protect the public at large. As it now is, we have laws and officials to see to it that the grocer's and milkman's measures are correct, so that the buyer be not cheated in the quantity, but practically we have no means of preventing a worse cheating as to quality. We have laws and officials to see that the butcher's scales are correct, but practically no means of seeing that the meat he weighs is wholesome. We protect the pocket but neither health nor life in many such matters.

The need of sanitary inspectors has been brought to the attention of our city government from time to time, but the proposition has not yet met with favor. Their appointment, however, is but a question of time; they will as surely be demanded by the community to aid in suppressing disease as the police now is for the suppression of crime and violence, and the next generation will as surely smile at our opposition and ignorant conservatism as we do at a previous generation for opposing lighting by gas, vaccination, and lightning rods. For, after all, we must ultimately depend upon the general intelligence of the community. No amount of official supervision can take the place or do the work which belongs to each individual—it must merely supplement and aid it. If liberty be worth anything, it must be used for the public as well as for private good, and if the health of a city could be entirely regulated and saved by a *board*, of what use would be individual liberty?

The official health board then should certainly labor in at least four directions:

1st, To do that which the free individual cannot do in his private capacity to protect himself from unwholesome conditions which arise from his neighbors.

2d, To see that the conditions which produce or spread zymotic diseases are suppressed or controlled.

3d, To educate the public in sanitary matters, advise it of real dangers, and quiet fear as to imaginary ones.

4th, To protect the poor from those dangers to health which they are particularly subjected to.

## SECRETARY'S REPORT.

---

The general character of the work of the year has been outlined in the preceding report, but before presenting detailed accounts of the different subjects there presented there are some more specialized labors and duties performed by different members of the Board, and by the Secretary, under direction and instruction of the Board, that require mention, in order to fully explain the work accomplished. The publications of the Board have already been alluded to as one of the methods of popularizing sanitary and hygienic principles; another method, which was mentioned in our first report, has been pursued as extensively as time would permit. That is by means of sanitary lectures, familiar talks, and discussions. A half or three-quarter hour lecture is given, generally followed by an informal discussion of the topics presented, or of others of local interest that may be brought forward. These have been well received and considerable interest manifested in the discussion of local sanitary questions. In another department Prof. Brewer has discussed sanitary subjects before farmers' conventions, and at the sessions of the State Board of Agriculture. These are of a more scientific character, and have been of the greatest value, in many instances involving the results of personal investigations.

This course will be continued, and in this manner much practical information disseminated, in a manner and method to render it of permanent benefit. Public hygiene has also received special attention at the Medical school, through the agency of Prof. Lindsley, so that the new coming doctors will be better rooted and grounded in this department than their predecessors. In connection with Prof. Northrop lectures have been delivered by the Secretary before village improvement societies, and on school hygiene before the different teachers' institutes in the State. A course has also been commenced at the Normal School, which is expected to be a yearly institution hereafter. The only limit to work in this department is time, as the demand and interest are unflagging. The results are, in many cases, direct and decided.



## SANITARY INSPECTIONS AND INVESTIGATIONS.

In many cases inspection of houses and grounds have been made, with reference to their sanitary condition, and full and explicit directions given for placing the house and its surroundings in a proper sanitary condition. Examination of the water of wells and of sources of public water supply have also been repeatedly made. This work will always be performed whenever circumstances warrant, on due notice being given. It is intended to render the Board as directly beneficial to the people as possible, and whenever there is good reason to suppose that local unsanitary conditions exist, examination will be made. Investigations will also be made on the appearance of any unusual forms of disease, upon notification of their existence.

## ILLUSTRATION OF THE APPARENT CAUSATION OF MALARIAL FEVER.

There were a number of cases of malarial fever in a limited locality in Durham, where no cases had previously been known, except from importation, and these were succeeded by severe cases of typho-malarial fever, no other cases existing in the town. A large swamp had been flooded the season previous to the outbreak of the first cases, and as all the cases were around this pond it was suspected as a cause. On examination there was found a depth of water not exceeding three feet in the deepest portion, and allowing the sun to strike through to the vegetation, which was covered with shallow water for the most part. Some fifty acres were thus flooded by a dam not over four feet high at any portion. The water was set back in the swamps for a considerable distance. The connection between this condition of affairs and the causation of malarial fever seems evident.

## SCAVANGERING, OR DISPOSAL OF FILTH AND GARBAGE OF TOWNS AND CITIES.

This includes the removal of ashes and dry house-dirt, cleaning streets and catch-basins, and the removal of offal. The system in use at Boston, Mass., is very thorough; a condensed outline of the plan is here given. Greater attention to this important subject is earnestly recommended to cities and towns; next to sewerage there is no subject that will better repay intelligent management in the interests of public health. The ultimate disposal of this filth is, too, a question of the deepest importance in a sanitary

sense. The whole matter is under advisement by the Board, and we hope soon to issue a circular of instruction. The use of street-scrapings to mend other places where the streets are defective, or to spread in a layer over the fine stones in macadamized roads, cannot too strongly be condemned. Malaria is more than invited by this process, and the evils of a filth-saturated soil are kindly disseminated. The ultimate results of an accumulated thickness of such a material in a roadway and a protracted heated term are a pestilence or epidemic; it is simply a question of time.

The filth to be removed by scavenging is of two general kinds—ashes and dry house-dirt, and garbage or offal. These should be kept apart, and separately collected and removed, and a stringent fine imposed by municipal or town law if they are not kept separate. Each householder should be compelled to keep a watertight and properly covered receptacle for house-garbage. These receptacles should be emptied by a city cart, which should be watertight, and removed beyond the city limits. There would be no difficulty in disposing of this matter; the city of Boston sells this for \$28,000, and it costs \$76,000 to remove it in the manner described. It is urgently advised that a regular garbage removal should be provided for in cities and towns, and the ashes and dry dirt be kept separate from the garbage. The street-scrapings are best disposed of to farmers, who would doubtless remove them for their value as fertilizers.

The ashes and dry dirt may be used in filling and grading; they should be as regularly removed as the garbage, and not allowed to accumulate. In spite of all care, garbage and decaying matter, especially dead animals—rats, cats, dogs, etc.,—will be mixed with the dry refuse, so that this material is unfit for filling ground to be used for the sites of houses. Decomposition goes on in this material for years, and extensive epidemics have been caused in houses built over land made by refuse. The removal of garbage, house refuse, street-scrapings, the contents of catch-basins and cesspools can be more readily secured than a satisfactory disposition of them. In this State, however, farming lands are so near the cities that they can be pretty well disposed of there. The contents of catch-basins, street-scrapings, dead animals, and the contents of cesspools, should be used as fertilizers on farms, and never in filling in. Too much carelessness is exhibited here, especially where ponds or shallows are to be filled; everything is there dumped, and a thin covering of ashes expected to answer all

sanitary requirements. The attention of local boards of health is respectfully directed to this matter. The epidemic of 1878 in New Orleans has effectually prevented the use of street-scrapings, and the mixture of offal and refuse above described, so far as that city is concerned. It is to be hoped that we will not in Connecticut wait for the epidemic we have in too many cases been assiduously inviting, carefully cultivating all the conditions; but in the future follow rational sanitary methods. Even if some outlay is involved, it cannot be more wisely expended.

A word as to the time for cleansing vaults. The day is far preferable; the odors stirred up at night in the still air remain, and cannot be excluded from sleeping apartments, and directly produce disease. In a sanitary point of view, the night should never be used to clean a privy-vault.

#### SLAUGHTER-HOUSES.

The attention of local boards of health is directed to these establishments; they should be excluded from city limits, unless the modern methods of disposal of refuse are enforced. By these, these establishments can be rendered as inoffensive as any other. A general law regulating noxious trades and industries is required, as nearly all can be so regulated that no danger to the health of the neighborhood will be caused. The exceptional cases should be removed to a distance from populous places.

#### SANITARY PUBLICATIONS.

One of the most important departments of labor engaged in by the Board is the publication of short, concise, and plain circulars or pamphlets on some hygienic subject, or giving exact and plain directions with regard to the prevention of disease. That on diphtheria, one of the first issued, has had a wide circulation, has met with general favor, and has been, in many cases, of great usefulness. It has received unqualified approbation from other Boards, and, in one or two instances, has been used as a basis for a similar publication. It is kept in stock and freely circulated whenever demanded. It is also sent at once where an outbreak of the disease occurs, to those likely to be interested,—school officers, and the like. Such publications receive much more attention when the disease on which they treat is actually present than at other times.

This year the circular on "treatment of the drowned" has been published, and as there has not been much time to accumulate experience on the subject, the circular of the Michigan State Board of Health was adopted. The Secretary, Dr. Baker, very kindly furnished the cuts to print from, thus saving us the expense. This has been partially circulated, and is now in stock. It is printed in two forms,—one on thick card-board, large size, for posting conspicuously in public places; the other of the right size to be carried in one's pocket memorandum book. This has also been very favorably received, and promises to be of usefulness.

TREATMENT OF THE DROWNED—TWO THINGS TO BE DONE: RESTORE BREATHING; RESTORE ANIMAL HEAT.

**RULE 1.** Remove all obstructions to breathing. Instantly loosen or cut apart all neck and waist bands; turn the patient on his face, with the head down hill; stand astride the hips with your face towards his head, and locking your fingers together under his belly, raise the body as high as you can without lifting the forehead off the ground (Fig. 1), and give body a smart jerk to remove mucus from the throat and water from the windpipe; hold the body suspended long enough to slowly count ONE, TWO, THREE, FOUR, FIVE, repeating the jerk more gently two or three times.



**RULE 2.** Place the patient face downward, and, maintaining all the while your position astride the body, grasp the points of the shoulders by the clothing, or, if the body is naked, thrust your fingers into the armpits, clasping your thumbs over the points of the shoulders, and raise the chest as high as you can (Fig. 2) with-

out lifting the head quite off the ground, and hold it long enough to *slowly* count ONE, TWO, THREE. Replace him on the ground, with his forehead on his flexed arm, the neck straightened out, and the nose and mouth free. Place your elbows against your knees and your hands upon the sides of his chest (Fig. 3) over the lower



ribs, and press downward and inward with increasing force long enough to slowly count ONE, TWO. The suddenly let go, grasp the shoulders as before, and raise the chest (Fig. 2); then press upon the ribs, &c. (Fig. 3). These alternate movements should be repeated ten to fifteen times a minute for an hour at least, unless



breathing is restored sooner. Use the same regularity as in natural breathing.

**RULE 3.** After breathing has commenced, RESTORE THE ANIMAL



HEAT. Wrap him in warm blankets, apply bottles of hot water, hot bricks, or anything to restore heat. *Warm the head nearly as fast as the body, lest convulsions come on.* Rubbing the body with warm cloths or the hand, and slapping the fleshy parts may assist to restore warmth, and the breathing also. If the patient can SURELY swallow, give hot coffee, tea, milk, or a little hot sling. Give spirits sparingly, lest they produce depression. Place the patient in a warm bed, and give him plenty of fresh air; keep him quiet.

#### BEWARE !

AVOID DELAY. A MOMENT may turn the scale for life or death. Dry ground, shelter, warmth, stimulants, etc., at this moment are nothing; ARTIFICIAL BREATHING IS EVERYTHING,—is the ONE REMEDY; all others are secondary.

Do not stop to remove wet clothing before efforts are made to restore breathing. Precious time is wasted, and the patient may be fatally chilled by the exposure of the naked body, even in the summer. Give all your attention and effort to restore breathing by forcing air into and out of the lungs. If the breathing has just ceased, a smart slap on the face, or a vigorous twist of the hair will sometimes start it again, and may be tried incidentally, as may also pressing the finger upon the root of the tongue.

Before natural breathing is fully restored, do not let the patient lie on his back unless some person holds the tongue forward. The tongue, by falling back, may close the windpipe, and cause fatal choking.

If several persons are present, one may hold the head steady, keeping the neck nearly straight; others may remove wet clothing, replacing at once clothing which is dry and warm; they may also chafe the limbs, and thus promote the circulation.

Prevent friends from crowding around the patient and excluding fresh air; also from trying to give stimulants before the patient can swallow. The first causes suffocation; the second, fatal choking.

DO NOT GIVE UP TOO SOON. You are working for life. Any time within two hours you may be on the very threshold of success without there being any sign of it.

---

In suffocation by smoke or any poisonous gas, as also by hanging, proceed the same as for drowning, omitting effort to expel water, etc., from the windpipe.



In suspended breathing from effects of chloroform, hydrate of chloral, etc., proceed by Rule 2, taking especial pains to keep the head very low, and preventing closure of the windpipe by the tongue falling back.

---

The foregoing method, originally published by the State Board of Health of Michigan, has the sanction of other State and City Boards of Health, and is fully endorsed by the State Board of Health of Connecticut, and printed for general distribution as a life-saving measure.

Address STATE BOARD OF HEALTH, Hartford.

The last circular, just issued, is on rural hygiene, with reference especially to the house and its surroundings. There is so much to be said on this topic that it is extremely difficult to condense and select the most salient points. Those have been taken for the most part that, in the experience of the members of the Board, in personal investigations, need most to be elucidated and understood. Many unsanitary conditions about the house are allowed to exist which would not be tolerated if their nature and effects were understood. Too great confidence is placed in country air.

It must be remembered that by the waste and excrementitious filth necessarily resulting from human and animal life, the immediate surroundings of a house, air, soil, and water may be poisoned even in the best selected location, and that carelessness or ignorance of the laws of drainage may give one a damp, cold, and wet site, where the appearances would lead one to expect the contrary, and thus entail all the evils that a wet subsoil slowly but surely induces.

### SUGGESTIONS ON RURAL HYGIENE.

*Relating principally to the House and its Surroundings.*

A dry, well-drained site for a dwelling-house is pretty generally conceded to be an essential requisite for a healthy home. The relation of damp, sodden foundations and wet, undrained surroundings to such diseases as rheumatism, diarrhœa, and consumption is recognized by nearly all intelligent persons, the facts relative to the latter disease having been demonstrated chiefly by Dr. H. I. Bowditch, of the Massachusetts State Board of Health.

But while the necessity for the removal of the excess of surface moisture has become a matter of general information, the reverse is true with reference to deep drainage, which is not so well understood even by physicians.

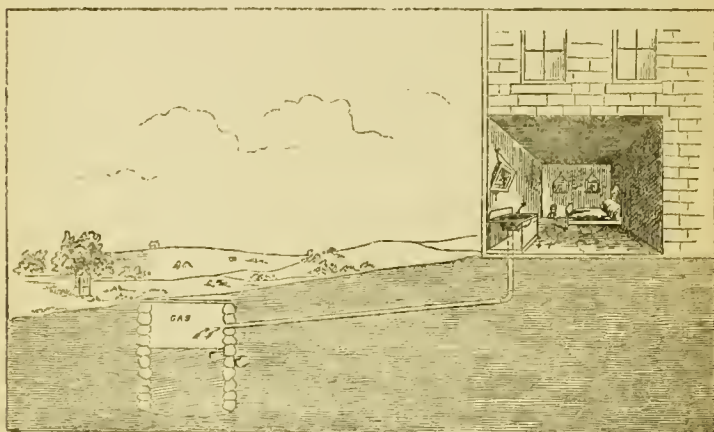
At a level, varying with the geological formation from a few feet to several hundred below the surface of the ground, we find the soil saturated, so to speak, with water. This may be considered as a sheet of water moving toward the sea with a slow but uniform motion, and feeding rivers and other water-courses perhaps as much as the brooks or streams which flow in upon the surface. This underground circulation of water is called subsoil or ground water. The latter term will be used in this circular. The level of the ground water at a river would be about the same as the bed of the river, gradually rising as you recede from the banks. Deep wells reach the level of the ground water, and their uniform level is a fair gauge of the level of the ground water. Retention of the ground water by natural or artificial means is one of the most fruitful sources of malarial diseases, which disappear when a free outflow is provided. One of the most striking examples in this country was furnished by the city of Detroit, where the mortality from epidemics of malignant malarial fevers was excessive, and epidemic dysentery and cholera prevalent, now one of the healthiest cities in the world,—the results of a complete system of drainage and abundant supply of pure water, although naturally most unfavorably located.

A house upon a sandy hillside may be malarious, so to speak, or a hot-bed of consumption, while one near a stream or upon low land may be dry and healthy. In the one case the outflow of the ground water is obstructed, while in the latter entirely free and unimpeded. The unhealthfulness of many an apparently well located dwelling is thus accounted for. It is evident that in many instances town or even State action is requisite to secure deep drainage. In constructing a house, deep drains should be carried under the foundation walls entirely around the house, with one or more branches from the center of the cellar. These should in no case be used for sewage. Systematic drainage by towns will of necessity receive more attention as the causal relation of retained ground water to malarial and other forms of disease is recognized.

The atmosphere does not end with the surface of the ground, but fills the spaces between the particles of the soil unless displaced by other gases or water, and plays an important part in the chemistry of plant life; but as in the case of the ground water, the ground air, as it is called, is considered here only in its sanitary relations.

The soil about country homes may be contaminated by soakage

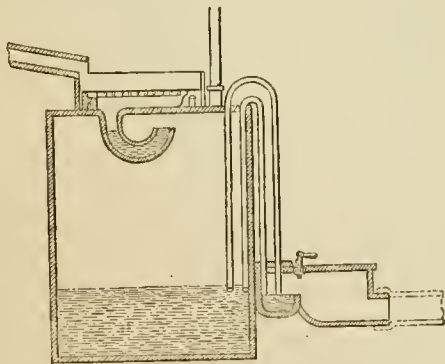
from leaky cesspools and privy vaults, and from decaying heaps of garbage and filth. The contamination of the ground air that results is more deleterious to health than the vile odors that may render the air disagreeable, but which are not particularly harmful. A house standing upon a gravelly foundation rests upon two-thirds small stones, one-third air. Now, as in this climate the houses are warmed a great part of the time, they act upon the same principle as a chimney, and suck up or draw in this ground air, which is colder than the air of the house, and influence thus a considerable area. Now, if the air, contaminated by contact with a soil polluted by kitchen or chamber slops, soakage from privy vault or cesspool, or any decaying mass or accumulation of filth in outhouses or surroundings is drawn into the house, as must of necessity happen if such sources of pollution exist, the air of the house is to this extent contaminated and devitalized, and becomes the predisposing cause of such diseases as diphtheria, cholera infantum, croup, catarrh, lung fever, consumption, and a host of minor ills that depress vital energy, lessen the working power, and shorten life. The products of decay from vegetable putrefaction in the cellar are by the same law of natural philosophy drawn up to devitalize the air of the occupied rooms.



One of the most common sanitary defects is illustrated in the above cut. A closed, unventilated cesspool communicates by an open, untrapped pipe directly with the house, so that all the gases of decay generated in the cesspool find their only outlet in the

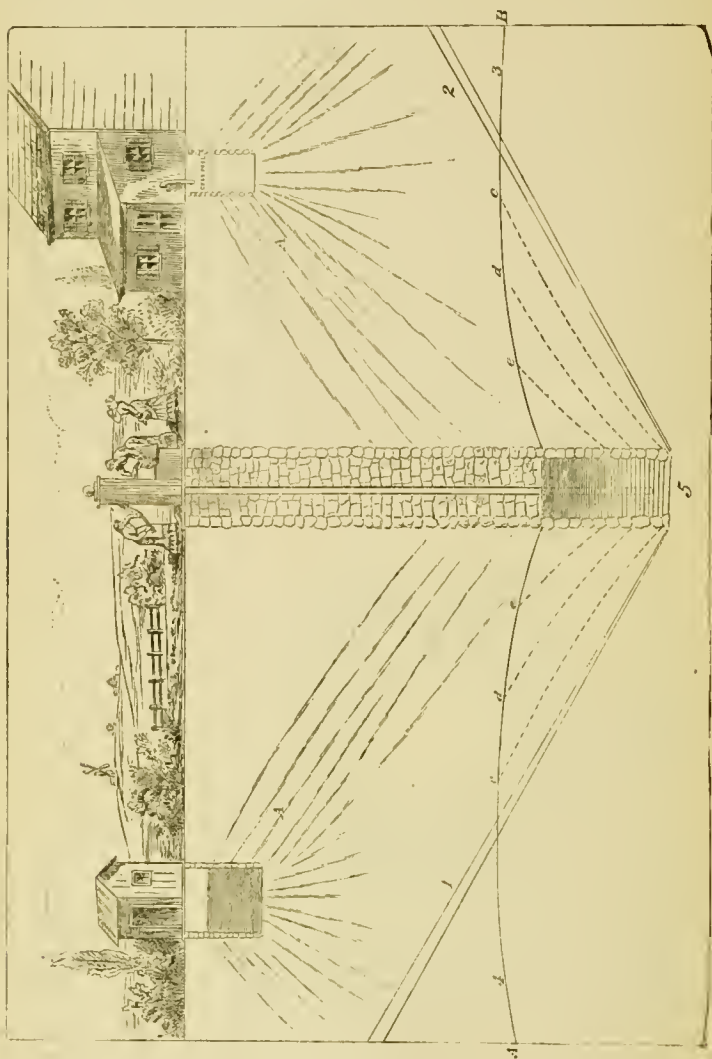
house, and are also drawn in by the difference in temperature already described. In other words, the house is used to ventilate the cesspool. In the instance from which this sketch was taken, the apparent result was the death of five children from diphtheria; three slept in a room adjacent, with the door open at night, two in the room above.

If cesspools are used they should be cemented water tight, ventilated thoroughly, and frequently emptied. The soil saturation resulting from ordinary careless methods sooner or later becomes a factor in the production of disease. The best method in a sanitary point of view is the absorption method. A series of porous tiles are laid a few inches below the surface, preferably of a lawn. These communicate with a flush tank, which empties itself automatically as soon as full with sufficient force to flush the pipes. This system has stood the test of time, and is well adapted for the sewerage of small towns where there is no water supply. The following cut illustrates the tank mentioned. If it is desired to irrigate different plots, the tank can be connected successively with each set of drain pipes.



It is hardly possible to fix the limit for perfect safety for the distance that should exist between privy vault, cesspool, and well. It is safe to say that, if used at ordinary distances, both vault and cesspool should be cemented water-tight. The principles of drainage are practically recognized by every farmer, almost, who learns by experience that a drain draws from a larger area after it has been in place awhile, and that channels of communication are formed in the soil along which the water finds its way to the drain.

Still it is seldom that they apply this to their wells, and we find outhouses situated within a few feet of wells, and the cesspool perhaps as near on the other side. A common error in this con-



nection is to conclude that, if the water from a well is clear, bright, and sparkling, and offends neither taste, sight, or smell, that it



must be pure. The reverse, however, is the case, and water that is the most decidedly contaminated by the products of organic decay may be the most pleasant to sight and taste. Indeed, such water is often sought for its pleasant qualities, as was the case with the famous Broad street well in London, which communicated cholera to so many persons. The accompanying illustration shows pollution of soil and water by cesspool and privy vault. The lines 1, 5, 2, 5 outline the drainage area of the well, which in this case includes both vault and cesspool. The line A, B indicates the level of the ground water, and the dotted lines show the local curves that would result in the level of the ground water if the well were drawn down.

The driven well, if driven deep enough, avoids contamination by surface water. The water from deep wells, when not contaminated by surface water, is of the best possible quality. Surface water may be excluded by laying the upper three-fourths of the wall of the well in cement.

Infiltration of the soil from the privy-vault may be prevented by cementing the vault so as to be water-tight. The earth closet system is to be unqualifiedly commended, and any one with the slightest ingenuity can construct one that will answer all requirements. An ordinary packing box and a large-sized coal hod furnish the requisite materials. If dry earth be not readily obtainable, ashes will serve equally as well. A corner of the box may be partitioned off to hold the earth or ashes, a seat and cover can be easily made, and for all practical purposes the result is equal to that achieved by the outlay of twenty-five to thirty dollars. The advantages and comfort of this system, especially in the winter months, for women and children, more than outweigh any slight trouble that may be involved. The pail system is well adapted for small towns where sewerage or the flush tank system are out of the question. If a general system for the disposal of this and other forms of filth cannot be made general throughout the town or village, a sanitary association or village improvement society might inaugurate the system, which, once started, would thenceforth be self-sustaining.

Excessive shading of house and grounds is not uncommon, and while shade trees add much to the attractiveness of a town or village, dense shading of the grounds or house induces dampness, and produces ill health by the exclusion of sunlight. The soil is often kept damp and unwholesome, and a constant decay of leaves



and other vegetable substances near dwellings, by dense shrubbery. Fresh air and sunlight should have the fullest access to all the immediate surroundings of the house. In a sanitary view the elm, with its more open habit, is the better shade tree for streets and yards. Human beings require sunlight as well as plants. In the back yards, near the neglected sink drain, a rank, nauseous vegetation too often exists, and a damp, filth saturated soil.

If disinfectants are to be used, the best are copperas or sulphate of iron for privy vaults, garbage heaps, and the like, and a solution of the sulphate or chloride of zinc for cesspools and sink drains. The prompt removal of all filth before decay commences is the sanitary method. But as this cannot always be secured, disinfectants must be sometimes used;—those mentioned as cheap, odorless, and efficient. Where the soil is saturated with grease or oil, the preliminary use of caustic potash may be requisite.

A saturated solution of copperas may be used,—that is, as much as the water will dissolve. From eight to ten ounces of the zinc salts to a gallon of water is a good solution. The chloride of zinc is strongly caustic; in strong solutions the salts may be used separately or together.

A circular on school hygiene is in course of preparation, and one on the sewerage and drainage of city houses. As circumstances demand, and time and funds allow, we hope to cover the field of the more important points involved in public hygiene.

In the department of vital statistics a resumé of the laws concerning marriage and the duties of registrars and of those solemnizing marriages has been published, and partially circulated. It is sent with each supply of blanks that are ordered, and will be until all towns are supplied, and then kept in stock for special needs. It will be found in proper place, following the registration tables. A similar circular relating to the returns of births and deaths will be issued during the next year.

Our system of blanks for the department of vital statistics is now about complete; with an admirable basis to start upon, the additions have been for the most part those relating to the sanitary work of the Board. In a visit of inspection the blanks met the unqualified approbation of Dr. Elisha Harris of New York, one of the highest authorities in the department of vital statistics.

## DISINFECTION AND DISINFECTANTS.

For all practical purposes the disinfectants most to be relied upon are copperas, the salts of zinc, the sulphate and chloride especially, and sulphur. Copperas may be used for privy vaults, cesspools, garbage heaps and the like, the salts of zinc for sewage, and in solution to disinfect cotton and linen goods used about the sick. There are other disinfectants of value, but these are inodorous, efficient, and easily handled. Their value has been demonstrated in the experience of the National Board of Health, the Auxiliary Sanitary Association of New Orleans, and of the New York Board of Health, as well as other organizations. Solutions of the zinc salts may also be used. The following instructions have been issued by the National Board of Health :

## INSTRUCTIONS FOR DISINFECTION.

## PREPARED FOR THE NATIONAL BOARD OF HEALTH.

Disinfection is the destruction of the poisons of infectious and contagious diseases.

Deodorizers, or substances which destroy smells, are not necessarily disinfectants, and disinfectants do not necessarily have an odor.

Disinfection cannot compensate for want of cleanliness nor of ventilation.

## 1.—DISINFECTANTS TO BE EMPLOYED.

1. Roll sulphur (brimstone) for fumigation.
2. Sulphate of iron (copperas) dissolved in water in the proportion of one and a half pounds to the gallon—for soil, sewers, etc.
3. Sulphate of zinc and common salt, dissolved together in water in the proportion of four ounces of sulphate and two ounces salt to the gallon—for clothing, bed-linen, etc.

NOTE.—Carbolic acid is not included in the above list for the following reasons : it is very difficult to determine the quality of the commercial article, and the purchaser can never be certain of securing it of proper strength ; it is expensive, when of good quality, and experience has shown that it must be employed in comparatively large quantities to be of any use ; it is liable by its strong odor to give a false sense of security.

## II.—HOW TO USE DISINFECTANTS.

1. *In the Sick-room.*—The most available agents are fresh air and cleanliness. The clothing, towels, bed-linen, etc., should on removal from the patient, and before they are taken from the room, be placed in a pail or tub of the zinc solution, boiling hot, if possible.

All discharges should either be received in vessels containing copperas solution, or, when this is impracticable, should be immediately covered with copperas solution. All vessels used about the patient should be cleansed with the same solution.

Unnecessary furniture, especially that which is stuffed, carpets, and hangings, should, when possible, be removed from the room at the outset; otherwise they should remain for subsequent fumigation and treatment.

2. *Fumigation* with sulphur is the only practicable method for disinfecting the house. For this purpose the rooms to be disinfected must be vacated. Heavy clothing, blankets, bedding, and other articles which cannot be treated with zinc solution should be opened and exposed during fumigation, as directed below. Close the rooms as tightly as possible, place the sulphur in iron pans supported upon bricks placed in wash-tubs containing a little water, set it on fire by hot coals or with the aid of a spoonful of alcohol, and allow the room to remain closed for twenty-four hours. For a room about ten feet square, at least two pounds of sulphur should be used; for larger rooms proportionally increased quantities.

3. *Premises.*—Cellars, yards, stables, gutters, privies, cesspools, water-closets, drains, sewers, etc., should be frequently and liberally treated with copperas solution. The copperas solution is easily prepared by hanging a basket containing about sixty pounds of copperas in a barrel of water.

4. *Body and Bed-Clothing, etc.*—It is best to burn all articles which have been in contact with persons sick with contagious or infectious diseases. Articles too valuable to be destroyed should be treated as follows:

(a) Cotton, linen, flannels, blankets, etc., should be treated with the boiling-hot zinc solution; introduce piece by piece, secure thorough wetting, and boil for at least half an hour.

(b) Heavy woollen clothing, silks, furs, stuffed bed-covers, beds, and other articles which cannot be treated with the zinc solution should be hung in the room during fumigation, their surfaces thoroughly exposed, and pockets turned inside out. Afterwards they

should be hung in the open air, beaten and shaken. Pillows, beds, stuffed mattresses, upholstered furniture, etc., should be cut open, the contents spread out and thoroughly fumigated. Carpets are best fumigated on the floor, but should afterward be removed to the open air and thoroughly beaten.

5. *Corpses* should be thoroughly washed with a zinc solution of double strength; should then be wrapped in a sheet, wet with the zinc solution, and buried at once.

Metallic, metal-lined, or air-tight coffins should be used when possible; certainly when the body is to be transported for any considerable distance.

GEORGE F. BARKER, M.D.,

University of Pennsylvania, Philadelphia.

C. F. CHANDLER, M. D.,

Coll. Phys. and Surgs.; Hlth. Dept., New York.

HENRY DRAPER, M.D.,

University of New York City.

#### DOMESTIC POISONS.

The cases of poisoning by a variety of fabrics and utensils in domestic use, if all were known and fully investigated, would excite sufficient attention to secure legislative action, to say the least. So fatal have been the effects, and so clear the connection between poisonous coloring matter used in candies and the results, that the use of the more active poisons has been about discontinued in their manufacture, and the principal adulterant now used is terra alba, which does not kill, but only produces dyspepsia and minor ills. Unhealthful coloring matters are still used, but the more deadly have been discarded.

Lead and zinc are often used so that vegetable and fruit acids dissolve them in directly harmful proportions. A variety of granite ware was found to contain soluble lead. If rightly manufactured, although lead is used it is rendered insoluble and therefore harmless. Canned meats were found contaminated by lead used in the solder. As stated before, little danger is now to be apprehended from either of these sources, but the carelessness of manufacturers of articles in domestic use in the handling of poisons borders on the marvelous. Their confidence in the protecting powers of Providence or some other agency is apparently unbounded.

One of the most striking illustrations was brought to the attention of the Board resulting from poisoning from aniline dyes. A

blue veil worn once caused an extensive and well nigh fatal eruption of the face, lasting for months, producing most distressing as well as dangerous effects. The mouth, tongue, and throat were involved as well as the face, as often in arsenical poisoning. The eruption caused great pain, was accompanied by swelling of the face and discharge, intolerance of light, and weakened sight for a long time after convalescence was established.

The veil on examination was found to be colored by a poorly made aniline dye. When placed in water it readily yielded up its coloring matter; this on examination was found to be aniline containing a large percentage of arsenic. Arsenic is used largely in the manufacture of aniline dyes, but if properly made nearly all is removed, and the small quantity remaining is fixed—that is, rendered insoluble. In this case the arsenic was not removed to any great extent, nor was it rendered at all insoluble. The use of a dye containing so large a percentage of arsenic in so readily soluble a form should be punishable by a heavy fine, to say the least. This is the most aggravated case we have known. Several minor cases from the use of the same class of dyes used to color flannels and stockings have been brought to our notice, but in these cases the neglect was in fixing—that is, rendering insoluble—the small quantity of arsenic that remains when the manufacture of the dye is completed. In the case of the veil, however, the large percentage of arsenic used in manufacture was not removed, neither was there any effort made to render it insoluble. A test, therefore, of the worst type of these dyes would be their solubility in water. The eruptions they produce are well marked, painful, and quite lasting. We have seen no fatal cases; that induced by the veil was very nearly fatal.

The effect produced by arsenical wall papers is now pretty well understood, so that the market for the sale of bright greens and the like tints is not very good; still arsenical dyes are used in papers not so readily recognized by the public; some white papers are as heavily loaded as the green, and dull greens are as dangerous as the bright. Dr. Taylor of London, an authority in medical jurisprudence, states, "The pigment of arsenicated wall papers contains a large proportion of arsenic, and from some of these papers in the unglazed state the noxious material may be easily scraped or removed by slight friction; thus arsenic is liable to be distributed through the air of the room in the state of fine dust." Workmen who hang these papers often suffer from chronic arsenical poison



ing. "Green arsenical lamp-shades have doubtless caused headaches, irritation of the eyes, and other symptoms that have been attributed to the use of coal gas, but the mischief was no doubt due to the arsenic in the shades."

A very obscure case, which was obstinate and failed to yield to the usual remedies was thus caused. The symptoms were severe, burning pains in the stomach, nausea, headache, alternate constipation and diarrhoea, loss of appetite, excessive thirst, nervous twitchings, shortness of breath. As soon as she was removed from her work these symptoms disappeared, to return as soon as her employment was resumed. The case was discovered to be one of chronic arsenical poisoning. Her employment was to put bright green bauds around packs of envelopes. The end of the band was gummed, and in moistening this with the tongue enough arsenic was absorbed to produce the symptoms described. She was supplied with a sponge and no further trouble ensued. Experience in the envelope works in Hartford has demonstrated the necessity of care in handling the bright green arsenicated paper.

Poisoning from the manufacture of artificial flowers used in millinery has repeatedly occurred, and several deaths and untold suffering have been thus caused. It would almost seem justifiable to prohibit the use of arsenic altogether in domestic fabrics of all kinds, even at the sacrifice of some bright tints and colors. In the case of aniline dyes they are all manufactured by the aid of arsenic—mauve, scarlet, and bronze, as well as green; and unless it is rendered insoluble harm may result. Gloves, veils, stockings, flannels, and woolen goods generally, in fact anything worn next the skin, should not have soluble or readily soluble coloring material. The following was lately reported by Dr. Geo. A. Rees to the *London Times*: "I have had occasion more than once to bring cases before the notice of the medical profession in which severe symptoms were experienced by patients who were being slowly poisoned by arsenic. This slow poisoning is going on at present very extensively. I have described a sad instance of poisoning by an arsenicated coloring matter contained in the green calico lining of some bed curtains. For months and months this source of poison was not discovered, and the symptoms were treated as those of natural disease. On the removal of the curtains the patient at once regained her health. There is another source of arsenical poisoning of which I have only lately been informed. It exists in the coloring matter of a green muslin much used for

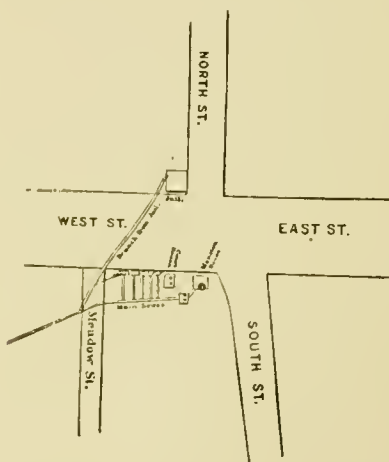


ladies' dresses. Dr. Debus, our Professor of Chemistry, who examined the curtain lining before mentioned, suspecting this, purchased a specimen for analysis. It proved to contain upwards of sixty grains of an arsenical compound in every square yard, and so slightly incorporated that it could be dusted out with great facility."

The examples in England of fatal effects from the use of violet powder containing arsenic were widely published, and show how readily arsenic can be absorbed through the skin. I have been largely indebted in presenting this subject to a little work by Henry Carr of London, Eng., on our domestic poisons, to which the reader is referred who wishes further illustrations of the use of arsenic and aniline carelessly and the evils that ensue. The quotations are from that excellent little work. The cases related were brought directly to the attention of the Board.

#### THE SEWERAGE OF LITCHFIELD.

The following brief account of the sewerage of Litchfield is given in order to record one of the important sanitary movements of the year, and for the benefit of other towns that may be contem-



plating similar work. The introduction of a public water supply and of a system of sewers should be as simultaneous as possible. With the use of Field's flush tank, illustrated in the circular on drainage, the sewers can be flushed even if there be no general water supply.

The sewer in this case drains all cellars and sinks of the district through which it passes. The laterals connected with the houses are flushed by cistern overflow; these are all trapped. The main sewer is flushed by water from the court house roof discharging into a flush tank, which works automatically. The main sewer is about a quarter of a mile long and has a fall of thirty-five feet. I am indebted to Dr. Deming for this account of the sewerage system.

#### LOCAL HEALTH BOARDS

Consultations with different local organizations have been frequent during the year. The use of small streams for the disposal of sewage has several times been brought to the attention of the Board in this way. This is a more or less common sanitary nuisance—a small brook is made the receptacle of house drainage, or contaminated by direct sewer discharge, until the volume of filth it receives is so great that the brook becomes in fact an elongated cesspool. The brooks thus used become a standing menace to the health of the neighborhood, and are accompanied by an undue prevalence of zymotic disease in the region surrounding. Radical measures for the relief of such conditions have resulted, in several instances, from the attention that has been directed to them. In many cases these are suffered to exist from simple negligence. The condition of the brook is a matter of gradual growth, and it thus escapes attention until it reaches considerable magnitude and becomes directly prejudicial to health. In the now historic instance of Over Darwen, more than a hundred deaths were caused from contamination of the water main by infiltration through the soil of the excretions of a typhoid fever patient. More recently, at Caterham and Redhill, twenty-one deaths were caused by pollution of the water supply by typhoid excretions. The danger of using small brooks as sewers becomes apparent, as they often run within communicating distance of wells, and thus the excretions from typhoid fever patients might find their way into drinking water.

The following account of an epidemic of diphtheria in Groveton, New Hampshire, is too instructive to let pass. There were 114 cases, fourteen fatal. The center of the infection was the school-house; this was situated twenty rods back of a mill-pond and at the foot of a small mountain. One of the brooks had been dammed by the boys and its current turned, so that in rainy weather it ran under the school, leaving at other times a stagnant pool. A boggy meadow was near the school-house; privies which had

not been cleaned for two years overhung this. At the head of the pond was a saw-mill and tannery; the sawdust and tannery refuse were thrown into the pond. This pond was drawn down to repair the dam, and often filled at night and emptied during the day. An intolerable stench was caused; twenty-two cases of diphtheria among the scholars broke out in thirty-six hours; the disease soon became general. The village was located in the adjacent valley. There was no diphtheria near, nor no visitors to or from infected places. The disease arose apparently *de novo* from filth. Its simultaneous appearance in widely separated places forbade the idea of contagion. Typhoid fever succeeded the diphtheria; but when the pond was kept full, the disease disappeared. (Reported by Dr. Watson of Groveton.)

It is not enough to secure a supply of pure well-water. Care must be taken to keep it pure and prevent the access of foul drainage.

The construction of reservoirs for the storage of a public water supply, and the nature of the water-shed best adapted for the collection of drinking water, has been brought before the Board, in consultation with local organizations. Wherever uncultivated land can be obtained for a reservoir, it is preferable; nor is a peat bottom objectionable if the water is of sufficient depth over it. The only objection to water collected from a peaty soil is the coloration, and this does not result from organic contamination, that is, from products of decay. In case of a storage reservoir the coloration is soon removed by oxidation. In case of a distributing reservoir a peaty bottom is decidedly objectionable.

All decaying vegetable materials should be removed, and the soil for several feet from underneath old buildings, haystacks, in fine, in any case where soil infiltration may have ensued from use of the soil for building sites or storage purposes. The effects of soil contamination are beginning to be understood.

The adulteration of foods has in a few instances been investigated. These are of three kinds: (1) Deleterious. (2) Fraudulent. (3) Accidental. The first are substances directly injurious to health; the second are simply for purposes of gain, and are far more common, as the substitution of glucose for cane syrup, a substance not harmful but containing much less saccharine qualities and of inferior value; Indian meal in mustard is another familiar example. Some work in this department has been done during the year, but a more systematic study is planned for

the ensuing year. In connection with the examination of the sanitary qualities of drinking water, chemical examination of foods will be undertaken more extensively. Cream of tartar is one of the substances most frequently adulterated, but the worst substance added is terra alba, the same that is used in candy. Adulteration is not, however, so common as sometimes represented, and is, as before stated, oftener for the purpose of passing off an inferior article for one of greater intrinsic value.

Accidental impurities often are found that are incidental to the manufacture of the article, these are to be expected and are to be carefully distinguished from those added by design. So far as we can judge the most extensive mischief arises from the adulteration of milk, and doubtless a large percentage of the infantile mortality of large cities is due to the lack of nutritive qualities in milk whose standard has been lowered by the addition of some foreign substances. Water alone will not answer, as it lowers the specific gravity, and renders the vender liable to detection. The substances added are not hurtful in themselves, but the nutritive quality of the milk is diminished. The use of glucose for sugar, and the sale of adulterated or skimmed milk for the genuine article, are perhaps as common as any.

There is no satisfactory model to copy after in framing laws to prevent and control the adulterations of foods, drugs, and medicines. The English law is perhaps the best, but it does not, in practice, always work smoothly and efficiently. The chances for evasion are very great. During the ensuing year it is expected that our sanitary laboratory will be established for the examination of air, water, and food, if we can accumulate a satisfactory balance for obtaining the necessary appliances.

#### PROSPECTIVE SANITARY WORK.

The establishment of a complete Sanitary laboratory has already been alluded to. At present we are able to make qualitative chemical examinations of drinking water, and microscopical examinations. The quantitative work has thus far been kindly performed at the Agricultural Experimental Station. The sanitary examinations of air, water, and food if made directly, would add a valuable feature to our work. We desire also to make arrangements for a systematic study of climatology and the meteorological conditions that influence health. The topography of the State in relation to local manifestations of disease is one important department that we

are now ready to study systematically. The results that await investigation in this field are of the greatest interest and importance. The investigation of local conditions offer opportunity for almost unlimited endeavor. The relations of climatology and meteorological conditions, however, should not longer be ignored. The lines of effort already established will be maintained as their apparent usefulness is constantly increasing.

The following additions have been made to the library of the Board during the year:

Hygiene and Public Health, Buck, 2 vols.

Latham Sanitary Engineering.

Sanitarian, Vol. 7.

Report Michigan State Board of Health, 1878.

Wanklyn Water Analysis.

3d Report Wisconsin State Board of Health.

1st " Rhode Island " " "

2d " Colorado " " " 1878.

" Louisiana " " " 1866.

" Minnesota " " "

Sanitary Record, 1879.

Denton, Sanitary Engineering.

McLagan, Germ Theory of Disease.

1st and 2d Reports New Jersey State Board of Health.

Blake, Sewage Poisoning.

Report on Diseases of Swine, Agricultural Department, Washington.

1st Report Commissioner of Health, Milwaukee.

Annual Report Board School Visitors, Hartford, 1878-9.

" " " " " Bridgeport, "

Adams, Railroad Accidents.

Teale, Dangers to Health.

Annual Report City of Meriden, 1879.

6th Registration Report, Michigan.

Plumber and Sanitary Engineer, 1879.

Transactions Boston Board of Health, 1876-78.

" New Haven Board of Health, 6 numbers.

Robinson Purification of Water.

Day on Ozone.

McKenzie on Diphtheria.

Field Sanitary By-Laws.

Blake, Croup and Diphtheria.  
 Virchow, Infectious Diseases.  
 Winslow, Spiritualistic Madness.  
 Public Health Report, 1877, London.  
 Local Government Report, 1877, "  
 Rawlinson Sewage Disposal.  
 Report on Diphtheria in North of London.  
 Carr on Domestic Poisons.  
 Blythe's Practical Chemistry.  
 Scientific American Supplement, 1879.  
 Eggleston, Villages and Village Life.  
 Report School Visitor, Meriden, 1879.  
 Charter and Ordinances City of New Britain.  
 Annual Reports, 1877-78      "      "  
     "      "      1878, Hartford.  
 Report City Physician, Concord.  
 Proceedings Conn. Pharmaceutical Convention, 1878 and '79.  
 Report Health Department, Baltimore, 1878.  
     "      "      "      Utica.  
 Report Water Commissioners, Hartford, 1878.  
 Ames' Odorless Excavating Apparatus.  
 Adams, The Public Library and Common School.  
 Northrop, Tree Planting, Lessons from European Schools.  
 6th Annual Report of the Local Government Board.  
 Report to Medical Officers of the Privy Council, 1876-77.  
 7th Annual Report of the Local Government Board.  
 Bowditch, Hygiene in America.  
 Calderwood, Relation of Brain and Mind.  
 Liebreich on School Life.  
 8th Annual Report of Local Government Board  
 Manchester Health Lectures.  
 Fothergill, Maintenance of Health.  
 Timmins on Disinfection.  
 Erichson on Surgical Evidence.  
 Report of Committee on Hygiene of New York.  
 Richardson's Ministry of Health.  
 Varona, Sewer Gases.  
 Drysdale on Infectious Diseases.  
 Squibb on Adulteration of Food.  
 Somers on Children's Lives, How to Protect.  
 Manual of Nursing.



- Parkes on Personal Care of Health.  
Brown, Medical Register of New England.  
Husband on Forensic Medicine.  
Buchan on Care of the Sick.  
Tidy Water Supply of London.  
Morrison, Purification of Water Carried Sewage.  
Report of Nashville Board of Health.  
Report of Board of Education Connecticut, 1878-9.  
Wilson, Summer and its Diseases.  
Proceedings of Association of Medical Officers for Care of  
Idiotic and Feeble-minded Persons.  
Sanitary Protection Association of Newport.  
Address before Citizen's Auxiliary Sanitary Association, Nash-  
ville.  
Reports and Papers before New Orleans Auxiliary Sanitary As-  
sociation.  
National Board of Health Bulletin.  
Waring, Excremental Diseases.  
Dr. Hart, Practical Hygiene.  
Waring, Causation of Enteric Fever.  
Jenkins, Healthy Homes.  
Stephenson, The Fight With Infection.  
Browne, Hygiene of the Voice.  
Report of the Health Officer for San Francisco.  
Nathan Allen, Lecture on the Education of Girls.  
Report of Committee on Public Health, Relative to Lunatic  
Asylums, courtesy of Hon. A. T. Goodwin, N. Y.  
Bartholomew, Address on Necessity of Educating the Public in  
the Principles of Medicine.  
9th Report of the City Registrar of Albany, N. Y.  
Derby on Anthracite.  
Trans. American Medical Association, 2 vols.  
Letheby on Foods.

C. W. CHAMBERLAIN.

## TREASURER'S REPORT.

---

Expenditures from Dec. 1, 1878, to Dec. 1, 1879,	-	\$1,738.48
Salary of Secretary,		1,000.00
Total,	-	\$2,738.48

Cash on deposit,	-	464.95
		<u>\$3,203.43</u>

Bills outstanding, about	-	\$250.00
--------------------------	---	----------

### RECEIPTS,

Cash,	-	\$3,000.00
Balance from old account,	-	203.43
		<u>\$3,203.43</u>

### TOTAL EXPENSES OF THE BOARD SINCE ITS ORGANIZATION, JULY, 1878.

Cash expended,	-	\$3,285.05
Cash received,		3,750.00
Balance on hand,		\$464.95

C. W. CHAMBERLAIN, M.D.,  
*Treasurer.*

Approved.

C. A. LINDSLEY, M.D.  
*Auditor.*

## GENERAL STATEMENT OF EXPENSES.

Salary of Secretary,	\$1,000.00
Blanks and Record books for Vital Statistics,	875.17
Sanitary Engineers,	378.00
Traveling expenses,	140.75
Photo-Lithograph Company.	99.90
Library,	138.00
Postage and express,	48.87
Incidentals,	21.75
Stationery,	36.04
Total,	\$2,738.48

Books for town records of vital statistics form a larger element in the expenses of the Board than will ever be likely to occur in any one year again ; between five and six hundred dollars are called for by that item alone. The expenses for certificates of births, marriages, and deaths are proportionately larger, as a general supply was called for as a necessary result of a change in the forms. Like expenses will not again be incurred, so that we shall have more funds directly available for sanitary investigation and work. We have made it a rule to keep a working balance in the treasury in case of the outbreak of any epidemic, as without the "sinews of war" we should be powerless to accomplish anything even in the face of the greatest danger. Our thanks are due to the zealous laborers who have given time and effort so freely to aid our work. As an example, the location of every case of diphtheria in Bridgeport for two years was verified by Dr. Wordin, in the construction of the map published in our last report, yet the only reward was the consciousness of work well done. Almost invariably we find all classes of persons willing to aid us in all possible ways. The topographical work that requires to be done to elucidate the local conditions influencing disease, and the study of climatology and meteorological conditions, demand attention as soon as means are available.

REPORTS  
OF  
SPECIAL COMMITTEES.

---

ON THE SEWERAGE OF INLAND CITIES,

DR. C. A. LINDSLEY,  
PROF. W. H. BREWER,  
DR. C. W. CHAMBERLAIN.

---

ON STATES PRISON INVESTIGATION,

PROF. W. H. BREWER,  
DR. C. W. CHAMBERLAIN.

---

ON POLLUTION OF STREAMS,

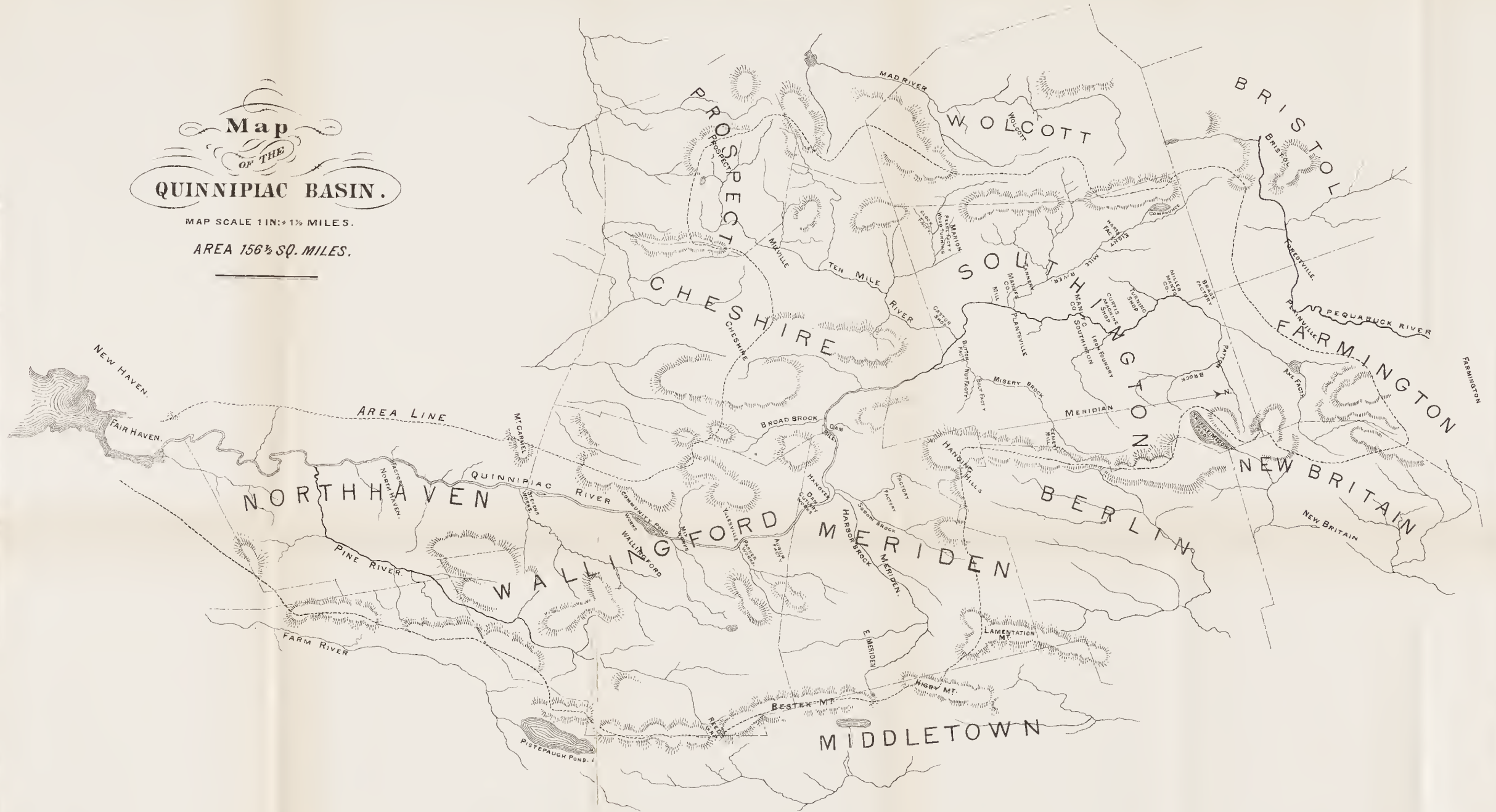
PROF. W. H. BREWER.



Map  
OF THE  
QUINNIPLAC BASIN.

MAP SCALE 1 IN: 1 1/2 MILES.

AREA 156 1/2 SQ. MILES.





This page has been intentionally left blank

## THE SEWERAGE OF MERIDEN.

---

This subject was first brought indirectly to our attention by the petition of the inhabitants of South Meriden, Yalesville, and Wallingford, with reference to the pollution of Harbor brook and the Quinnipiac river from the sewage and manufacturing waste received by Harbor brook in its passage through Meriden, which place it entered as a comparatively pure stream, and, as was claimed, was so contaminated that the health of the inhabitants of these villages was seriously impaired in consequence. In investigating the subject it was soon evident that the health of the city of Meriden was as much involved as that of the villages mentioned, and much more so than that of the more distant villages, and that the real point at issue was the disposal of the sewage of Meriden, without detriment to the health of its own citizens or of its neighbors. As an invitation was later received from the Mayor and Council of Meriden to investigate the sanitary condition of that city, the whole subject will be discussed under that heading to avoid unnecessary repetition, as the discussion of the points involved in the following letter from Mayor Lines includes all the topics presented by the petition before mentioned. The letter is as follows:

MERIDEN, August 6, 1879.

DR. C. W. CHAMBERLAIN,  
*Secretary State Board of Health:*

DEAR SIR: Pursuant to a vote of the Common Council of the city of Meriden, passed Aug. 4, 1879, the undersigned have the honor to invite the State Board of Health to inspect said city with reference to its sanitary condition, our desire being that you visit us within the next two weeks if possible, or as soon thereafter as practicable—the wish of the city government being to have the advice of competent and disinterested men as to what action should be taken to promote the health and cleanliness of this city without causing damage or unnecessary annoyance to our neighbors. We trust it will be convenient and agreeable to your board to make this examination, and that your report shall cover the whole ground. We shall be very glad to afford you every facility

possible, and hope the result will be to the advantage of Meriden and all her neighbors.

Very Truly,  
H. WALES LINES, *Mayor.*  
JOHN L. RICHMOND,  
*Chairman Health Com.*

Prof. Brewer, Dr. C. A. Lindsley, and the secretary were appointed as a special committee in response to this invitation, were directed to make a complete and thorough study, and were given ample authority to employ experts, procure maps, charts, and surveys whenever requisite. A complete topographical survey of the city of Meriden was obtained from S. C. Pierson, city surveyor of Meriden, and a map of the basin of the Quinnipiac from special surveys, the maps of the coast survey, county and township maps. The relative position of these towns and villages is well shown, and the location of every dam on the river. The map of Meriden shows also the density of population, the location of the principal manufactories, as well as the level of the streets. The sharp grades and abrupt changes of level are important elements in the problem.

The city lies in a circular basin, surrounded by mountains, and as will be seen at a glance, has but one outlet for drainage—by Harbor brook and the Quinnipiac river; this much is settled by the topography of the place.

The study of the questions involved in this case includes more points of general interest and importance than any that have been brought before the Board, and we have endeavored to make our work as thorough as possible. The latest phases of the sewage disposal question have been stated in our general report. This is in advance of any action yet taken in this country, and the irrigation plan has not been tried here on a large scale. How much the deep frosts of this country would interfere with the process is not absolutely determined, although there seems no reasonable doubt after the experience of Worcester and Lenox. It is not, however, claimed that the ideal has yet been reached with reference to the ultimate disposal of sewage, only that this plan is the most satisfactory yet devised, and by far preferable to the deposition or precipitation methods. The irrigation and filtration plan certainly promises to be unvaryingly successful.

Many of the questions involved here belong to the domain of the sanitary engineer. We at the outset availed ourselves of the

services of one of the most eminent and well known experts in that department, Col. Geo. E. Waring, Jr., whose report is here included. We have been largely guided by his judgment and present his opinions on many points, resting upon the authority of an expert in matters concerning which we can, from the nature of things have but a general knowledge.

The question generally stated is, therefore, about as follows: The city of Meriden, a rapidly growing city, with large manufacturing interests, having introduced a plentiful supply of water, must of necessity be sewered; how, therefore, can the sewage and manufacturing waste be disposed of without injuring the health of its own citizens or that of its neighbors? The brook which flows through the city is manifestly inadequate to safely dispose of the sewage, moreover, its course is obstructed by a dam near the city, which adds to the present unhealthful condition, delaying the outflow of the sewage, and thus promoting putrefaction. If the sewage and manufacturing waste can be rapidly removed and sufficiently diluted, the problem is solved. The manufacturing waste is, with the exception of that from the woolen mill, beneficial to the sewage rather than otherwise.

The small brooks which are used as open sewers are often over-taxed, and, in one or two instances, soil saturation is directly produced thereby. The present outbreak of diphtheria commenced in one such locality, that had been selected for thorough overhauling by the Board of Health. The maps indicate the volume of water that flows in the different streams proportionately, also, the probabilities of the Quinnipiac providing a never-failing volume of water for the proper dilution of the sewage. The subjoined letters\* give the results of direct investigation.

---

\* DR. C. W. CHAMBERLAIN,

DEAR SIR: I have this day measured water running in Quinnipiac River, below Hauover Dam, and find the same to be 4,270,000 gals. to the hour. Have also measured the run of Harbor Brook in this city, just below Miller St., and find result 495,600 gals. per hour. I measured the Quinnipiac in the tail race of the cutlery works, the water just dripping over the dam (allowance duly made and added for same), time, 10 A. M.; and at 11.30 measured Harbor Brook. In both cases, of course, the water is rather low. I measured the river and the brook last March, when more water was running, and in both measurements the ratio of brook to river is nearly 1 to 9.

Respectfully yours,

S. C. PIERSON.

---

The different points involved in the case are pretty thoroughly presented in the report of the Board to the Common Council, with that of Col. Waring. An abstract of Col. Waring's paper, read at Nashville, which was also sent with the other papers, is given here, as it describes the plan advised.

OFFICE OF THE STATE BOARD OF HEALTH, {  
STATE HOUSE, HARTFORD, NOV. 15, 1879. }

*To His Honor H. Wales Lines, Mayor of the City of Meriden, the Honorable Court of Common Council, and John L. Richmond, Chairman of the Health Committee:*

The following report is respectfully submitted in response to your invitation to inspect the City of Meriden, and make such report as would cover the whole ground of the sanitary condition and requirements of the city. The questions involved have been somewhat intricate, and we have endeavored to give them sufficient and exhaustive consideration, with the aid of expert advice on matters that specially required the skill and training of the sanitary engineer. With reference to the organization of the health department, we would make the same recommendation for Meriden as for most of the cities in the State, that a permanent health board be established, with five members, three of whom should be physicians, to serve for a term of three years, with the Mayor chairman *ex officio*. The value of such an organization in inaugurating and

---

DR. C. W. CHAMBERLAIN,

DEAR SIR: I have this day visited Hanover, and obtained the information you desired. Saw Messrs. Howell and Cady, practical managers of the Cutlery Co., who stated that no one had kept statistics, but in their observation the following things may be counted on: In 1868 there were six weeks when water did not flow over the dam at all. (They had kept the wheel running the usual running time, 10 hours.) They think that during the last two years there have not been more than six nights that the apron was not wet.

In dry times the ten hours' run draws the water down twelve inches.

For an average of all the years of their connection with the company (more than eleven years) the water has run over the dam 75 per cent. of the time while the power was in use.

Altogether it shows a very *uniform* and copious flow of water in the river. Mr. Cady states that he has had considerable experience with different water privileges, but considers this Hanover Pond the finest in that particular (uniformity).

Respectfully yours,

S. C. PIERSON.

carrying forward systematic measures for improving the sanitary condition of the city would soon be demonstrated. The use of the small streams as open sewers is to be deprecated, and when they are manifestly inadequate, cemented vaults should be required by city ordinance, this subject should be placed under the direction of the health board, as also the systematic scavenging of the city, which should be regularly and thoroughly provided for at the public expense. Proper receptacles for the storage of garbage, ashes, and refuse should be required by ordinance, to be emptied by the public carts.

All minor points, however, might be safely left to an intelligent local board of health, which should have power to make and execute all such regulations, all expenditures to be regulated by the Council, as in other departments of the city government.

The zeal and activity of the present Health Committee are worthy of all commendation, but the nature of their work, indeed, has brought them to about the same conclusion as we recommend. It is established beyond controversy that the rapid and complete removal of waste and excrete matter, or the sewerage and drainage of a city, is essential to comfort and health, is a prime necessity under all conditions, and rendered especially necessary when an abundant and constant water supply is provided. This Meriden has exceptionally good, both as to quality and quantity, but with no system of sewerage. The retention of refuse and excrementitious matter for any lengthened period of time in privy vaults, cess-pools, slaughter-houses, or in any other places in the midst of towns or inhabited districts, and the saturation of the soil creates a nuisance dangerous to health, and has a close and causal relation to the prevalence of disease. The importance of thorough and systematic drainage, by which the subsoil water of wet districts may be lowered and be preserved from pollution by the filth and refuse of towns, is beginning to be recognized. Malarial diseases have thus been caused to disappear from special localities and wide areas of country, while consumption, the peculiar scourge of New England, has been notably diminished in frequency, as repeatedly demonstrated both in this country and Europe, and the general healthfulness markedly increased, as shown in lessened sickness and death rates.

The drainage of the low lying land in the central portions of the basin or valley of Harbor Brook is impeded by the dam a short distance below the town, and, as a matter of course, the natural



drainage of the whole region is interfered with, and subsoil moisture retained in the higher levels as well as the lower. This necessarily favors the existence and prevalence of malarial diseases, and would be ground enough to recommend the removal of this dam, if for no other reason. The lowering of the bed of the stream and its use as an outlet for the surface drainage, as recommended by Col. Waring, would still further aid in complete drainage of the district, and conduce to its general healthfulness.

The present defective methods of disposal of the sewage affords examples of the most dangerous and offensive forms, and those conditions most detrimental to health. A large proportion of the sewage and manufacturing waste finds its way to Harbor Brook; by the dam below the city a settling basin is formed, extending up the ravine nearly to the borders of the city, and from the intermittent use of the water, from the reservoirs above the city the banks for a considerable distance are alternately covered and exposed. While covered the solid material of the sewage is deposited, and when exposed to the sun, dried, and taken up into the air, to carry the germs of disease and pollute the air along the course of the stream. The pond thus formed during a considerable portion of the year is a mass of putrefying and decaying sewage, pouring deleterious gases into the air. These can be seen bubbling up through the turbid fluid, and a thorough analysis further demonstrated the nature of the processes here taking place.

The question whether Harbor Brook furnished sufficient volume of water to dilute the sewage and manufacturing waste of Meriden, so that it would be safely disposed of by aeration before decay and putrefaction should commence, is largely a question of sanitary engineering, so that in our conclusions we have been largely guided by the opinion of Col. Waring, who was employed by the board to investigate the whole field, with reference to an outlet for the sewage of Meriden. The amount of sewage material now to be found at different points was also ascertained by careful analysis, the results corroborating the conclusions reached before from the conditions of the case.

As it is a matter of constantly increasing importance and necessity that the city be provided with an adequate system of sewerage, the question arises: How can this be accomplished, so that no interests be jeopardized? This result can be permanently and effectually secured by providing a trunk or main sewer, whose outlet shall be below the dam at South Meriden, and the disposal of the

sewage by irrigation and filtration upon the land which is there naturally favorable for such use. This, in a sanitary sense, is the most satisfactory solution of the problem. The experience of other cities similarly situated has proven its value, and there is little question that sooner or later some such disposition would be made, even if at first the plan was adopted to use the river. By adopting this course at the outset all harrassing and needless litigation would be avoided, and the question satisfactorily settled for all time. By combining the system of filtration and irrigation less land would be requisite, and a better provision made for the winter months. The experience of some thirty or forty cities has demonstrated the value of this method ; its permanency is shown by the use of the meadows near Edinburgh for hundreds of years, as after the first outlay but little care and superintendence is requisite. The tendency is strongly towards this method of the disposition of sewage wherever practicable, unless it can be discharged directly into the sea, and to the absorption method rather than the cesspool system, wherever a small lawn is available. In all probability the sewage would be sufficiently diluted if discharged directly into the Quinnipiac, below Hanover dam, near the junction of the mill-race with the river. In the opinion of Col. Waring, this would be a satisfactory disposition of the sewage for a city much larger than Meriden. Or subsidence tanks might be provided, and the resulting sewage settlings, mixed with the ashes and garbage of the city, be used as a fertilizing material for the plains below Meriden. The most satisfactory, and, in the end, cheapest and best disposal of the sewage, however, is by the method of irrigation and filtration first indicated.

By order of the State Board of Health,

C. W. CHAMBERLAIN, *Secretary.*

JOHN S. BUTLER, M.D., *President.*

The following is Col Waring's first report, which was subsequently confirmed. An estimate will be given in appendix of the expense of the system.

Dr. C. W. CHAMBERLAIN,

*Secretary State Board of Health, Connecticut :*

DEAR SIR:—After an examination of the conditions affecting the questions submitted to me in connection with the sewerage of Meriden, I beg to report:

I. The delivery of a considerable amount of household drainage and of manufacturing waste into the Harbor brook within the city of Meriden, now existing, may reasonably be considered a legitimate subject of complaint on the part of those who reside near the Hanover pond, in which the waters of the Harbor brook are arrested. If there exists in the village of Hanover a specially bad sanitary condition, it would certainly be reasonable to ascribe it largely to this fouling of its pond.

Naturally, as Meriden grows and as more of those living near the brook and its branches seek to relieve themselves of the inconvenience of overflowing cesspools by discharging the surplus waste into these streams, this difficulty will increase and become more serious. I should say, however, that the probabilities are that Meriden itself will suffer quite as much from the arresting of foul matters along the course of the brook and in Andrew's pond, as the people of Hanover can from the deposit in their own pond.

II. So far as the village of Hanover is concerned, the difficulty will of course be seriously aggravated by the carrying out of any comprehensive system of sewerage which shall have the effect of delivering into the Hanover pond a very increased amount of organic waste, all of which will be carried directly to the outlet of the sewer, instead of lodging, as much of it now does, along the course of Harbor brook. Even the present amount of sewage, if delivered through pipes so that it would all be carried forward to the outlet, would become much more serious, so far as the village of Hanover is concerned. Of course, the adoption of any sewage system will lead to a very great increase of such delivery.

The execution of the system of sewerage at present contemplated by the city of Meriden would further increase the difficulty by adding a large amount of road wash to the household and manufacturing wastes above referred to. I therefore suggest that it should be made a condition precedent to the carrying out of the proposed system of sewerage in the city of Meriden, or of any other system of sewerage that may be substituted therefor, that, *as the beginning of the work*, an outlet sewer should be constructed to deliver at a point below the Hanover dam. By the plan proposed, it is contemplated to deliver the sewage matter into the present bed of Andrew's pond, Andrew's dam being removed.

This would lead to the delivery of nearly the whole volume of sewage matter into the Hanover pond, which could not fail greatly to aggravate the present unfavorable conditions.



SCALE ONE IN=1500 FT

S. C. PIERSON  
City Eng'r

This page has been intentionally left blank

The delivery of the sewerage of Meriden into the stream at the foot of the Hanover dam would, in my opinion, remove every reasonable objection that the village of Hanover could bring against the carrying out of the proposed work.

In time, but perhaps in a very long time, as the population of Meriden increases, and as the banks of the Quinnipiac below Hanover become more densely settled, the population perhaps even as far down as Wallingford would be annoyed and endangered by the delivery into the river.

Should these conditions arise, it will be a very simple matter to purify the effluent during the summer season, when alone this will be necessary, by the agricultural irrigation of the lands a short distance below the village of Hanover and on the west side of the river. It did not seem to me, in my examination, that it would be either cheaper or better to attempt to purify the effluent by irrigation between Meriden and Hanover pond.

III. As the question submitted to me related also to the sanitary condition of the city of Meriden itself, I beg to call your attention to two considerations which seem to me important.

1. The plan of sewerage now contemplated for Meriden has in view the removal of a very large proportion of the storm-water—the water of all rains except such very severe or prolonged storms as occur only five or six times during the year. It is seriously to be doubted whether in a sparsely settled community, with a large surface area in proportion to the population, any country town or city like this can afford or needs a provision for removing storm-water by underground conduits. The plan proposed will be enormously costly in execution, and will still be inadequate for the only storms which could cause any damage to public or private property. There is at present no provision for an underground removal of storm-water, yet, so far as I can learn, no serious damage is ever produced by storms; and the slight inconvenience resulting from overflows, as at the corner of Main street and Veteran street, may be obviated by works of very trifling cost. If the idea of taking storm-water or surface wash into the public sewers is given up, and the size of the different sewers is adjusted to the removal of household and manufacturing waste only, the whole problem will become very much simplified.

The system of sewers which I have in mind would be sufficient for the removal of the waste of a population of 50,000, with a proportionate increase of its manufactures.



2. While the withholding from Harbor brook of all organic wastes, except the street wash, which would enter the stream only when considerably swollen by rains, would so ameliorate its condition as to remove the offensiveness of which complaint is now made during the summer season, it is worth while to consider the great improvement to the public health that would result from a sufficient drainage of the swamp which now occupies the heart of the city. This can be perfectly accomplished by removing Andrew's dam, and by lowering the bed of Harbor brook quite through the whole length of the city, so as to bring the surface of the water ten feet below the flat lands adjoining it. This improvement would be of only temporary value if it stopped at a simple deepening of the brook, leaving its shores and bed subject to disturbance by floods. It would be necessary to give a smooth, narrow, and permanent channel to the stream. With the grade afforded by the natural conditions the ordinary flow of the stream (the flow at the time of my examination) would be carried by a semi-circular channel five feet wide and two and one-half deep at the center. This chaunel should be, of course, securely paved with stone or planked to afford protection in time of flood. The sides of the channel above the edges of this gutter should be sloped back at least one and one-half horizontal to one perpendicular to the height or nearly the height of the stream.

Throughout a large part of the course, this slope could be sufficiently protected against the action of occasional floods by sodding. But in situations where grass would not grow, as where the stream passes under buildings, bridges, etc., the slope should be paved.

A similar improvement of the tributary streams of Harbor brook, reducing the level of the water to at least five feet below the surface of the ground, I am confident would result in an amelioration of the sanitary condition quite equal to that sought by means of sewerage.

Very respectfully yours,

(Signed)

GEO. E. WARING, JR.

NEWPORT, R. I.

#### ABSTRACT OF COL. WARING'S NASHVILLE PAPER.

The arguments in favor of exclusion of storm-waters from sewers are in brief :

1. The increased cost of the large sewers.
2. Increased difficulty in ventilation with increase in size.

3. The larger become sewers of deposit, especially in hot weather, and their contents decompose.

4. The increased volume increases often the difficulty of satisfactory ultimate disposal.

5. The catch basins oftentimes become nuisances.

In the plan for small sewers the smallest should be six inches in diameter; no larger size until this with its branches, at time of greatest use, fill half full, and the size should then increase gradually. The interior should be kept perfectly smooth. Care should be taken to prevent roughness at joints. Terminal sewers should be provided with a flush tank at upper end to secure daily flushing. Sufficient man-holes to provide ventilation should be furnished—one every 1000 feet. Every house should be connected *without a trap*, but with soil pipe four inches in diameter running to a point above the ridge of the roof. The inlets to the sewer should be funnel-shaped, pointing towards the direction of the flow. The outlet, if water-locked, should be provided with means for admission of fresh air—if open, protected from winds.

The system of small pipe sewers for the removal of foul drainage, manufacturing waste for the most part, excluding surface and storm waters, is unqualifiedly recommended by the Board. The character of the subsoil favoring soil contamination, easily becoming "excrement sodden," is a strong argument in favor of impervious sewers. If constructed so as to allow the entrance of subsoil-water, the sewers will of necessity allow the filthy sewage liquids to pass out. The drainage can be readily provided for by agricultural tile drains, if necessary accompanying the sewers, laid alongside them.

There is little doubt but that the health of Meriden and South Meriden have been unfavorably affected by the present disposal of sewage. The great prevalence of diseases of zymotic type, of malarial fevers, and depressing, debilitating forms of sickness, bear witness to this fact. The letter of Dr. Nickerson, a careful observer, is interesting in this connection:

MERIDEN, CONN., Sept. 28, 1879.

DEAR DOCTOR: My friend, Dr. Catlin, handed me your letter of the 15th inst. asking for information in regard to the malarial epidemic in our vicinity, and at his request I will make a brief reply.

When I came here from the army in 1865, I found frequent evidence of malarial infection, and early found that I was compelled to recognize that fact in my treatment of nearly all my cases

of disease. I met many instances of sciatic neuralgia, ophthalmia, bilious colic, dysentery, etc., of a decidedly intermittent type, and curable by the use of quinine in full doses. But after consultation with physicians, I think I am safe in saying that the first cases of well marked "chills and fever," so called, indicating the onset of a sharp epidemic, occurred in 1868, and they became more numerous until, on my return from Kansas, in 1870, I found it prevailing extensively in Meriden and vicinity, being especially severe in the village of Hanover, two miles south.

We had previously had two summers of unusually long continued heat, prostrating our nervous systems and rendering us peculiarly liable to malarial forms of disease. Gradually the manifestations of the attacks lost their purely nervous character, and we had the continuance during the interval of symptoms that pointed to chronic engorgement of the liver, stomach, and spleen. Bilious remittent fever, once a *rara avis* in New England, became the prevailing type of fever after a time, not so readily arrested during the first week, but in many cases developing typhoid symptoms after nine or ten days.

In 1875 the epidemic seemed to have reached its most violent point, and we have met less cases of decided intermittent, attended by marked chill, fever, and sweating, but we find very common all the phenomena characterized by the books as "chronic malaria," all cases being more persistent, more depressing, attended by more evidence of gastric disturbance, and less amenable to the usual forms of medication.

We now have typho-malarial fevers, bilious pneumonias, low types of dysentery, persistent enlargement of liver and spleen, accompanied by severe and obstinate cough, pains in the side, etc., rheumatisms of a decided malarial form, and a peculiar affection attended by spinal tenderness, and tingling in the extremities.

During the past five or six years we have watched, in connection with the above, the gradual development of a typhous element, complicating nearly all the malarial forms of disease. This we have attributed to our vicious hygienic surroundings, our increasing population, our want of any proper system of sewerage, all rendered more virulent by our liberal water supply. In other words, we have been once more illustrating the fatal experience of a growing city introducing a water supply without the compensating sewerage. This element has given us many diphtheroid diseases—croup, erysipelas, puerperal fever, etc., etc., which have been the main contributors to our large death list, and still continue with unabated force.

Practically all these should be considered as complications of the main epidemic—the malarial,—and my observations in Meriden during these years gives me confidence to affirm that more lives would be saved if we could, in our treatment of all the above forms, pay less attention to these complications and keep our eye

steadily directed to the epidemic extensively prevailing at the time.

I remain, very respectfully,

Your obedient servant,

N. NICKERSON.

DR. C. W. CHAMBERLAIN,

*Sec. State Board of Health, Hartford, Conn.*

The existence of malarial fevers along the valley of the Quin-nipiac is apparently part of the general movement, as there has been a steady encroachment upon new territory each year, both Hamden and North Haven below Wallingford have suffered much more severely than the villages between North Haven and Meri-den ; in Hamden and vicinity there was excessive mortality from typho-malarial and congestive fevers—twelve deaths in Hamden, and five in North Haven. So that the existence of malarial fevers in the region generally is part of a general epidemic influ-ence whose causes and periods are not yet well understood.

The typhoid and low æsthenic debilitating forms of the disease are doubtless favored and induced by sewage emanations. In the opinion of Dr. E. M. Hunt of New Jersey, and others, malarial fevers are produced by excremental contamination of soil, water, or air, in the same general manner as typhoid. However that may be, there is little doubt of the baleful influence upon health of Harbor brook and its emanations in its present condition. The following analyses show that traces of sewage contamination can hardly be found by the time Wallingford is reached:

	HARBOR BROOK.			QUINNIPIAC RIVER.	
	At An-drew's Dam.	Hanover.	Yalesville, Mix's.	Above Meriden.	Walling-ford.
Total solids—grs. per gallon,	12.7	5.5	7.2	4.9	6.1
Of such, volatile be-low red heat,	3.0	2.2	2.7	1.0	1.6
Chlorine,	0.46	.23	.27	trace	trace
Free Ammonia, parts per million,	.93	.28	.315	.063	.076
Albuminoid Ammonia, parts per million,	.27	.07	.020	.032	.020

There is no very great difference between the last two, yet the first is water taken from the Quin-nipiac river a mile above Meri-den, between Meriden and Cheshire; the latter, water from the

lower end of the reservoir at Wallingford. All trace of sewage contamination has almost if not entirely disappeared; the difference, indeed, is not well marked. Following the course of the Quinnipiac from Yalesville to Wallingford in a flat-boat, it was found to be quite rapid often, and the water thrown into ripples and exposed to the air by frequent shallows and light falls and rapids. This condition of the river would indicate the possibility of a complete oxidation of the sewage if discharged into the river, the changes taking place so uniformly and rapidly that no gases of decay would contaminate the air, consequently no detriment to health ensue. If diluted with a proper volume of water, sewage can be disposed of by water carriage without detriment to the health of any living near the stream thus used. Of course, the less of such material finding access to our rivers the better, and we should advocate the purification of all sewage before its admission to any river; but if that cannot be secured, the next best plan must be followed.

The committee of the Common Council of Meriden have accepted the recommendations of our report with some reservations, as follows: (Since then an estimate of the cost of the small sewer system has been furnished by Col. Waring, and is given below. We here quote from the Meriden committee's report.)

"In the first place, Andrew's dam should be removed and the mud and filthy sediment cleaned out. We do not propose the lowering of Harbor brook through the city, for, among other reasons, the nature of the subsoil makes it too costly an undertaking, and we are convinced that when the railroad bridge is built and the deposits above that point removed to the established grade, the drainage will be satisfactory, or as nearly so as we can afford to make it. We favor the establishment of the bounds—sides, top, and bottom—of the several brooks flowing into the main stream, the capacity of the several streams to be such as will discharge the water of their sheds in times of great storms. We urge that the several streams, including Harbor brook, be regularly cleared of filthy deposits, the construction of pipe drains for large accumulations of storm-water. . . . We advocate the disposal of sewage . . . by means of small pipes and a comparatively small trunk sewer to some point below Hanover dam, there to discharge into the river.

## " ESTIMATE FOR SEWER.

Main trunk, 18 inch sewer,	18,400 feet, at \$1.30,	\$23,920
15 " "	1,350 " 1.00,	1,350
12 " "	13,050 " .82,	10,701
10 " "	16,775 " .71,	11,626
8 " "	49,945 " .59,	29,467
6 " "	63,820 " .53,	33,825
		<hr/>
		\$110,889
Add for work, etc.,		15,000
		<hr/>
		\$125,889
15 per cent. for engineering, quicksand, etc.,		18,883
		<hr/>
		\$144,772
\$10,000 for land drainage,		10,000
		<hr/>
		\$154,772

"The estimate formerly contemplated involved an expenditure of \$550,000," that is sewers to include surface and storm-water, with outlet at Andrew's pond instead of below Hanover. The lessened cost of labor since the former estimate is probably offset by the difference in outlet.



## NEW BRITAIN.

---

Like most of the older cities constructed before the value of the services of the sanitary engineer was appreciated, many artificial sources of water, air, and soil pollution detrimental to health have been caused as a busy, thriving, manufacturing city was developed from the straggling, irregularly arranged collection of buildings that first marked the site. Other than sanitary considerations generally control the location of cities and villages. Some natural advantages for manufacture or commerce control the selection usually, the higher levels are chosen for the construction of dwellings, the low lands used for shops, stores, and factories.

In process of time, however, as the necessity for tenements near the centers of work and trade increases, the low lands are utilized for buildings; swamps and hollows that have been filled in with refuse and garbage are used also as sites, and dwelling houses are constructed upon this reeking, fermenting, and in some cases excrement-sodden foundation. The natural slopes and levels receive no attention, nor in the process of grading, constructing new streets, and public works generally is the slightest consideration given to the outflow of the ground water when the provisions for its movement that naturally existed are carelessly obstructed and destroyed.

As a matter of course no thought is paid to removing conditions naturally unfavorable to free drainage. The relations of the level of the ground water to the healthfulness of a place have indeed been but recently recognized; as a general rule the lower the level of the ground water, that is, the further it is necessary to go below the surface before the water line is reached, the greater is the healthfulness of a place, and the nearer to the surface the ground water reaches the greater the unhealthfulness to be expected, with of course some exceptional conditions. The most unsanitary condition, however, is a constantly fluctuating level. This explains one of the natural disadvantages of New Orleans:



*This stream from the mouth of the sewer has a rapid current and finally empties into Little River - Hartford.*

**Map of  
NEW BRITAIN,  
*showing sewer system.***

## EXPLANATIONS.

The area within this line is mostly low, swampy ground, poorly drained in many sections. Within this area Dysentery and Malarial diseases have been very prevalent.

The outline of the base of Walnut Hill.

From the Dam the bed of the stream is rocky. The current is very swift. This stream is the outlet for the sewerage of the southern portion of the city.

This page has been intentionally left blank

the ground water comes within two or three feet of the surface, and by constant action soon permeates the walls of vaults, cess-pools, and the like, and allows seepage of their filthy contents. The ground water when polluted is a ready carrier of contamination constantly in action. After a while the occurrence of some epidemic, either caused directly or prepared for by the polluted ground water and contaminated soil, attracts attention to the unsanitary conditions that exist, and sewerage, and perhaps drainage, are considered.

One of the resultants of impurity of ground, air, and water—for we must remember that there is no vacuum in nature, and that the spaces between the molecules and particles of the soil is occupied by fluids or gases, and above the level of the ground-water these spaces are filled with air, which also is in constant motion, and is more or less laden with the moisture, and as a matter of course with all the pollutions of the soil and water. A cellar thus becomes an intercepting tank for the reception of the ground-air which is eventually drawn up into the occupied rooms. The ground-air contaminated by the gases from sewers and drains thus infests every nook and corner, and, as has already been stated, is drawn in by the difference in temperature creating an inward and upward draft in the house.

Each year as the population increases, the amount of waste and filth to be disposed of increases *pari passu*, and the distance between wells, cellars and houses and accumulations of filth of all sorts lessens. With sublime indifference to results, filth is allowed to accumulate in vault and cesspool, and few think of any regular and systematic methods of disposal, until compelled by actual necessity. Such receptacles are, as a rule, entirely neglected.

These are some of the unsanitary conditions that are caused by carelessness, and ignorance of the principles of hygiene. Public parks, drainage, sewerage, and a pure water supply are neglected as well, until the city has grown to considerable dimensions; last of all, and to be searched for far and wide, are school-houses, churches, and public buildings constructed and maintained in accordance with hygienic laws; these are not the first buildings constructed for such purposes by any means, but are the last of a series, resultants of a process of evolution. The development theory appears to fit in here charmingly, especially in the requirements it makes in the element of time.

At present there is no difficulty experienced in the disposal of

the sewage of New Britain. A good outline of the proposed system is given by the accompanying map. As will be seen, the greater part is to be discharged into one of the branches of Little river. This stream flows through the towns of Newington and West Hartford, joining the Little river in the latter place. It is a very rapid stream in the greater portion of its course, and flows over a pebbly bed varied with cuts through the clay. Its whole course was followed up by the committee of the Board, and several specimens of the water analyzed. In New Britain a brook of considerable size, in fact the head-waters of the stream, is turned into the trunk-sewer, and flows through it constantly, thus keeping the trunk-sewer flushed, and diluting the sewage. The sewers in New Britain receive the surface and storm-water, and as they are built of pervious material, act also in lowering the subsoil water.

The alternation of hill and lowland is indicated in the map. On the north and west of the city there are hills with an elevation of 600 to 800 feet, running north and south, and among these hills is Shuttle meadow lake, the source of water supply for the city. This lake is shown in the map of the basin of the Quin-nipiac river situated just beyond the divide outside the area line of the valley of that river. The water is upland surface water. The pond is filled in summer with vegetation, which sometimes gives the water an unpleasant taste.

The pond is an artificial body of water, high, rocky cliffs rise abruptly on the east and west side, on the north the land rises gradually and is under cultivation. The water is carried  $2\frac{1}{4}$  miles to the distributing reservoir on Walnut Hill, shown on the map. A million gallons per day is the average use. The water as stated becomes offensive in summer, and well water is often substituted. There are four public fountains in the city.

The area included within the city limits is four square miles, about one-fourth of this closely built up. The trunk sewer is half a mile long, and there are four miles of sewers constructed which empty into this; the smaller branch sewers are circular, 18 inches, of Akron pipe, brick, from 20 to 42 inches, egg-shaped. The trunk sewer is of brick, circular in shape, and is six feet ten inches at mouth.

Branch sewers are planned for the whole city. House connections in case of the sewers laid are not yet universal. So the question as to the capacity of the brook to dispose of the sewage is not yet fairly tested. As it does not touch any inhabited region

for some time, it may prove adequate to dispose of the sewage before it reaches closely inhabited regions, or any dwellings near its banks, as it flows through fields. The sewage would be unobjectionable in cultivated fields, as it would add to their fertility. Some enterprising farmer might now find it to advantage to construct channels through his fields to divert the stream and cause it to yield up a portion of its fertilizing material before it passes along. There is abundance of land well situated for irrigation, which offers a solution for the problem of the ultimate disposal of the sewage, should the capacity of the brook be overtaxed. The rapid current and the amount of vegetation along its banks favor the rapid disposal of the sewage. Already the meadows through which it flows take on a richer green for considerable distance along its course. As the stream runs, it has probably a twelve-mile course before emptying into Little river. The bends and turns are numerous.

A question arises, however, of more importance when the brook flows through pastures and is used for a water supply for cattle. Thus far not enough sewage enters the brook to cause any apprehension on this score, even in low water in summer, as the volume of water from the water supply would maintain some volume to the stream, also the manufactories contributing some from their reservoirs.

The spread of typhoid fever and diphtheria through the medium of milk, as described in the case of typhoid fever by Drs. Duncan, Ball, and others in England, and the epidemic of diphtheria in the north of London, reported by Dr. W. H. Power, attracted considerable attention, and the question was asked whether in the case of sewage water being drunk by the cows the milk might not become infected.

In the instances above referred to the milk became infected by human agency after it was stored in pails or pans or in process of milking. Scarlatinal infection is believed to have been communicated to milk during the act of milking, by persons the skin of whose hands had been peeling during convalescence from that disease. "In Penrith a domestic servant suffering from typhoid fever was brought home to her parents, who supplied fourteen families from their dairy. Seven of these families took the disease. There had been no previous cases." In Dr. Ballard's report 107 cases occurred. The dairyman and two of his family had typhoid fever. The well was a few yards from the privy.



The handle of the pump was chained and locked. A sudden cessation of fever cases occurred about fourteen days later, just the incubation period of typhoid fever.

The milk becomes infected, therefore, in cases when it becomes the agent in the spread of disease. The washing of pails and cans in infected water would be sufficient to infect the milk. Unless, therefore, the cattle were made sick by the drinking of impure water, it is not easily seen how any danger could arise. Thus far cattle have refused to drink badly tainted water, and it is not probable that it would be consumed under circumstances that would render it noxious. What the results might be in case of a severe epidemic of scarlet fever or diphtheria in New Britain is a matter of conjecture. It is not, however, probable that the disease germs would survive passage through the digestive organism and secretory systems of the animal and infect the milk. There is a thousand-fold more danger of milk becoming infected by cases of infectious disease in the dairyman's family or the contamination of the water used about the dairy in cleansing the pans, etc.

A systematic removal of garbage should be provided, and greater care in disposing of the scavenging waste and the exclusion of garbage and offal from the material used in filling and grading. As the country becomes more densely populated greater care will be compelled in such matters. Next to sewerage a thorough scavenging ranks in the sanitary requirements of city.

The following mortality statistics are instructive :

	1875.	1876.	1877.	1878.	1879.
Malarial fever,.....	1	4		3	8
Typhoid fever,.....	11	7	8	1	1
Cerebo spinal,.....	7	2	1		1
Erysipelas,.....	2	1			
Dysentery,.....	1	1	2	5	1
Diarrhœa, .....	51	20	16	10	14
Scarlet fever,.....	1	1		17	9
Diphtheria,.....	11	54	31	6	7
Croup,.....	8	15	5	1	1
Measles, .....			1		
Whooping-cough,.....			1		
Consumption,.....	28	18	14	20	18

# THE POLLUTION OF STREAMS.

PROF. W. H. BREWER.

---

This subject has been discussed in this State during the past year more than usual, but this is because of a growing interest in the matter rather than because of any new features. Special cases have been before the Board, but there has been no general investigation made by the Board or its committee sufficiently full to call for an extended report.

But throughout the world, every year shows a growing sentiment for the better legal protection of the purity of drinking-waters. This is much easier where the source is in springs or wells, because of the localization of such water supply; and yet, as a practical matter, it is often much more difficult to effect than it ought to be.

In the case of streams, it is vastly more difficult for a variety of reasons, not the least of which is that the manufacturing industries are affected, and moreover its relations to the general health is more extensive and varied. This question is now more generally before sanitarians than any other single sanitary problem, and as yet no solution has been reached which will satisfactorily reach all the difficulties. The best results are compromises which have been reached at the expense of other disadvantages. It is before every Health Board in some way. The International society for the prevention of pollution of rivers, the soil, and the atmosphere, held its third annual meeting at Baden Baden in September of this year, and indeed we may say that the whole civilized world is at this problem.

There are now over twenty places in this State with water-works, about three-fourths of which are public works, the others are private companies. Sixteen of these works supply places having an aggregated population estimated at 230,000. Anything so directly affecting the health of so many people in this State should

receive an amount of attention and study we have as yet been unable to give, further than to attend, as best we can, to the special questions when they arise. Any general report must therefore be deferred.

## REPORT OF COMMITTEE ON STATE PRISON.

---

In April the Prison Commissioners asked the Board of Health to make a sanitary inspection of the State Prison at Wethersfield. In response to this, Dr. Chamberlain and Prof. Brewer, as a committee, have twice visited the prison, respectively on Tuesday, April 29, and Saturday, Dec. 6, 1879.

At the first visit a careful examination was made, and various things were found in the sanitary condition of the place which the committee found reason to criticise, and to make recommendations accordingly. At the time of the second visit, the sanitary conditions were so much better that the examination was not carried farther than to the shops, the yard, and the manure heaps in the rear.

Between the dates of these two visits, inquiries were made relative to other prisons; both members of the committee visited in person the Tennessee State Prison at Nashville, and one member the State Prison at Auburn, N. Y., and the State Prison at Richmond, Va., and inspected the sanitary conditions, arrangements and appliances, the hospital, and the method of keeping the hospital books. Every facility was most courteously afforded for their investigations.

It is impossible to say how much of the sickness and mortality of the year previous to our first visit was due to conditions beyond the control of the prison officials; and the method of keeping the hospital records is such that it is very difficult, if not practically impossible, to learn from them what the health or sickness of the prisoners was at any one date or period.

"The Cove" back of the prison is doubtless an unwholesome neighbor, but so long as the prison is where it is, this must be endured. The prison itself is faulty in its original construction. The hospital accommodations are not what they ought to be, and the committee think they should be bettered, and if the State concedes with these views and is ready to act, this Board will be glad to render any aid it can.

In the meantime the committee beg leave to make the following suggestions:

1. That the *insane* be treated elsewhere than in the prison. This ought to need no argument at this period in the history of prisons, and in the light of our present knowledge respecting the treatment of the insane—and, indeed, the committee have no new arguments to offer. A prison, and a hospital for the treatment of the insane, are so opposed to each other in all their objects and practices, save the one of isolation from society, that it ought not to be asked that the officers of the prison should manage both kinds of institutions. When the physician in charge, or any other properly constituted authority, is convinced that a convict is insane, every interest of humanity and the ultimate good of the State demands that he should be treated in the way which experience has shown as best for the insane, and by those persons to whom the State has entrusted the special care of such unfortunates.

### DAILY HOSPITAL REGISTER

For the month of . . . . . 18

DATE.	Patients in Hospital.	Out Hospital.				Whole Number in Prison.	No. Received in Hospital.	No. Discharged from Hospital.	No. Died.	REMARKS
		No. Applications for Treatment.	No. Treated.	No. not Treated.	No. Excused from Work.					
1										
2										
3										
4										
5										
6										
*										
*										
*										
29										
30										
31										
Total										

A

2. That a different system of hospital records be adopted. In all those other States where we have any special information pertaining to this subject, the records are kept much fuller and more systematically than in ours, and in some, if not in all, this fuller information is specially demanded by State laws.

We recommend that three books be kept for classifying hospital information, besides the daily blotter.

The first, which may be called the *Personal Record*, to contain the physical condition of each convict at the time he is received into the prison, (or when the book is opened,) and of his ailments later, that his condition during his prison-life may be learned without wading through the daily reports for the whole period.

The second to be a *Daily Hospital Register*, so kept that the sanitary condition of the entire prison as indicated by the sickness of the prisoners may be seen each day, the pages so ruled that each page will be the register of a month. A blank is appended marked A, as a suggestion. This has been suggested by and simplified from the "Daily Prison Register" used in the prisons of New York State, where the record is carried out to sixteen columns, but which we have simplified to nine.

## MONTHLY HEALTH STATEMENT.

B	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
I. <i>Zymotic.</i>													
Malarial Fever, - -													
Typhoid Fever, -													
Diarrhœa, -													
Contagious Diseases,													
Other Zymotic Dis'es,													
II. <i>Constitutional.</i>													
Rheumatism,													
Consumption,													
III. <i>Local.</i>													
* * * * *													
IV. <i>Developmental.</i>													
Old Age, - - -													
V. <i>Accidents.</i>													
Hurt in Shops, - -													
Other Accidents, -													
* * * * *													
Total, - - -													



The third, which may be called *Monthly Health Statement*, to show the prevalence of each ailment for each month of the year. A blank, marked B, is appended as a suggestion rather than as an absolute model, the list of diseases to be as full as the size of the page will allow, but made fuller than my sheet shows. If preferable, such a statement might be made for each week, but we think that for each month will be on the whole better. In some States, such a monthly statement is required by law to be presented to the Legislature at the end of each year.

The value of such records as we have suggested will not, we think, be questioned, and that it is perfectly practicable for the hospital attendant to do it is proven by the fact that in other States they are so kept, and indeed much fuller than we have recommended. The plan for hospital records was submitted in outline to the physician in charge and the warden, and met their approval.

3. That the place in the rear of the yard used to deposit filth, to be sold as manure, be entirely covered by a roof, and that the material during the warm weather be removed as fast as it accumulates.

•

---

SPECIAL REPORTS.

---

DRAINAGE OF FAIRFIELD.

---

SICKNESS FROM IMPURE ICE.

---



## DRAINAGE OF FAIRFIELD.

---

The following account by Mr. F. Sturgis of Fairfield presents a graphic account of the changes in that locality and the drainage work undertaken. The accompanying map shows the relation of the points mentioned. The letter presents the subject so fully that no further comments are required. With the omission of a few sentences, it is as written:

FAIRFIELD, November 25, 1879.

DR. C. W. CHAMBERLAIN,

*Secretary of the State Board of Health.*

*My dear Sir:* At the suggestion of Dr. Garlick, I beg to offer to you a summary of the drainage work undertaken and accomplished during this season in this village, and to submit for your consideration the reasons which have induced us to undertake it. The accompanying diagram will give you the relative positions of the various portions of the work, and will serve as explanatory of the general subject. Fairfield and Mill Plain I shall speak of as a whole, in order that I may cover the ground which has occupied our attention. This district is bounded on the west by Mill river, on the east by Ash creek, on the north it follows the course of Mill river until it reaches the hills, and on the south is bounded by the Sound. The lay of the land is first the sand beach, then an extent of salt meadows, then the two sections of flat land, comprising the thickly populated part of each village, and then the hills. The soil of Mill Plain is underlaid, with coarse, porous gravel down to the springs. That of Fairfield is underlaid in part with sand, and in part with loamy gravel, or in some places with hard pan. As you approach and rise to the hills, you meet spurs of rock, generally draining in lines parallel to the streams, and find a sandy, loamy soil mixed with coarse stones. My recollection of the physical condition of the locality goes back to 1840. Since then I have marked the changes by periods of years.

Commencing at the east, or Ash creek, in the past we found a tide stream of large volume, dammed at a distance of half a mile

from the mouth, and occupied by two large flouring-mills. The mouth opened at right angles with the beach, with a depth of water sufficient for sloops to go to the mills.

Now, we find the mills and tide-gates gone, the dams only existing as barriers to the proper flow of water, the creek gradually filling, the mouth no longer navigable, and the course of the stream turned parallel with the beach. Turning to Mill river on the west, we found a stream, forming at its mouth the harbor of Southport, occupied a short distance from the mouth by a tide-mill to which sloops could go, and about two miles above no less than four or five mills, all running. Now we find a harbor with difficulty kept open, the tide-mill running but seldom, and but one of the other mills in existence. The mill-ponds as a rule filled up with mud nearly to the surface of the water, and a constant accretion of mud in all parts of the river-bed.

Between the two streams mentioned there was Pine creek coming in from the Sound, with an open mouth, and furnishing a large volume of salt water for all the marshes of the village. In its wider parts, it had a width of 100 feet; as a boy I have crabbed from bank to bank with ample water at low tide for my boat. Now you find the old mouth closed by a large sand-bank, and the stream, making its way out parallel to the beach. The mouth is reduced in width, and in my opinion does not allow one-half the water to go in that formerly did. The channel is reduced in the wider parts to a width at low tide of twenty feet—the remainder being filled with mud on each side, scarcely covered at high tide. The portions of the creek where eel grass formerly grew as the mud has accumulated have become covered with a species of pest-weed. And in general, where formerly were wide ditches with abundance of water, you now find mud and but little water.

Drawing a line north through the middle of the village, you find the minor rills draining toward Mill river on the west, Pine creek on the west center, and toward Ash creek on the east center, and east, excepting those which drained into a pond called Hyde's pond, which lay on the west of the center line and which had no visible outlet.

The trees in this locality have increased largely in the past forty years. Then it would be called, perhaps, sparsely wooded, now almost densely wooded. In 1840 there was no railroad, and the hill-streams found their way without difficulty to their natural outlet. Now we find the railroad embankment cutting off many

of the streams with insufficient or filled up culverts, and in many instances no outlet provided. My remembrance of the health of the villages is that we had no thought of chills and fever, or malarial disease in any form. The growth of chills and fever has been gradual and increasing, until within the past two or three years it has been almost an epidemic. It has seemed to me that the atmosphere has entirely changed, during the summer it has been very oppressive and dank, producing a sensation of oppression to the whole system almost insupportable.

After our Centennial celebration, July 8, 1879, several gentlemen in the village of Fairfield, whose minds had been considering the faults of drainage of their section, and who appreciated the necessity of restoring by some means the character for health of our town, met together and resolved to form a Village Improvement Society. Under the auspices of that society the various works have been done. My own conclusions in regard to the subject were as follows :

1st. That in the mill streams the removal of the mills had taken away the flush necessary to keep them sweet, and free of mud banks. Hence the gradual filling of the mill-ponds, and the formation of mud banks in all parts of the stream.

2d. That in Pine Creek the neglect of the mouth, allowing it to close, and the neglect in not regularly cleaning the ditches, and the formation of obstructions to the outlet of the tide water, have caused an unhealthy accumulation of vegetable matter throughout the whole meadow surface.

3d. That depression of the surface formerly drained has been allowed by neglect to become filled up and stagnant.

4th. That other depressions have been caused by the running of the railroad across the foot of the hill, and by not in all instances providing proper outlets for the water.

5th. That time has made many places, formerly *not unhealthy*, now positively unhealthy by the gradual hardening of the under gravel.

(I have specimens of ground taken from some of my work where water has stood for many years, which are as hard as concrete, and entirely impervious to water.)

6th. That the increased number of trees has also caused places to become unhealthy which formerly were not so.

The works undertaken and completed, and which all bear upon my theory of the remedy for our difficulties, I will enumerate by number, and mark them on the map.



No. 1. A drain of 1,800 feet, to carry the water as it falls and runs from the neighboring hills, from the flat and depressed surfaces of Mill Plain to the river, instead of allowing it to stand and soak away into the ground, or to rise to such a height as to make



its way over gardens and under barns to the level of drain No. 2.

No. 2 is a short drain of 250 feet, carrying the water from the road and from a field where a pocket had formed of impervious ground, and where water lay until it evaporated.

No. 3 is a short drain of 300 feet, draining a hole (formerly, I am almost certain drained, although we found no evidence of it,) from which the surrounding inhabitants say a cloud arises so thick that it can almost be cut with a knife, and so offensive as to compel the closing of doors and windows.

No. 5 is the rebuilding of a bridge, and the lowering of its bed two feet and a half, so that the water flows out as low as the tide will permit it. This water way had filled up two feet and over, thus preventing the flow from all the ditches above to that extent. This creek is the upper part of Pine Creek, and receives into it the water from the hills back of Mill Plain, through the brook into which No. 2 drain empties, also the water from No. 6 drain.

No. 6 drains Hyde's Pond, and takes off all the water from a large section formerly under water in heavy rains and spring time. It is 1,500 feet long, and of 15 x 20 pipe.

No. 7 is a drain of some 1,800 feet, draining a bad hole (which was formerly drained, but entirely filled up,) and a large section of the back part of the village of Fairfield, next to the hills. This was a most important work.

No. 8 is a drain from the section of meadows lying between the center of the village of Fairfield and the Sound. In years gone by there was a creek putting up into this section of the town, and into it drained that part of the village around the churches and Court House. Time filled up the creek, and the drainage water made a pond called Reed's Pond. This is now successfully drained, and the adjoining land owners can continue the work of draining their own land.

No. 9 is a successful drain on a novel plan. The water is taken from the Meadows into a reservoir or catch-basin on the crest of the beach, and makes its way out by the natural passage through the sand. A tide trap prevents a flow of salt water backwards.

No. 10 is a drain from a depression in the hills in which the water had become stagnant.

No. 11 a long extent of drain pipe (some 1,800 feet), which relieves a hill section of surface and standing water.

You will thus see that we have done a large amount of work since September 1st. I am in hopes that more work will be undertaken next year, after the public mind becomes more aroused, and more attention is given to the study of the subject.

## SICKNESS FROM IMPURE ICE.

---

The following data are very kindly furnished by Dr. Orlando Brown of Washington, Litchfield Co., under whose care the greater number of these cases were. The subject is a very important one, and all clear instances should be recorded, to prevent similar occurrences.

The town of Washington possesses the usual topographical features peculiar to Litchfield County, with perhaps less swamp land and stagnant water than the towns in the immediate vicinity. Thus far it has enjoyed complete immunity from malarial diseases, which is indeed the case with all but one or two towns in the county. There has been no epidemic form of disease of any kind for several years past.

The local conditions of the case are as follows:

The house is situated in a little valley among the highest hills of the region. The occupants were farming people of intelligence, the head of the family quite prominent in the public affairs of the town.

The family consisted of the man and his wife, aged respectively 51 and 46, the wife's mother, aged 69, two children—a boy of 12 and a girl of 14 years—a laborer employed on the farm, and a woman employed to do general housework. There had been no sickness in the family previous to August 6, 1879. The boy was then attacked apparently with a mild form of dysentery. There had been during the summer in different parts of the town here and there a few cases of dysentery, otherwise no unusual prevalence of intestinal diseases. The dejections were frequent of bloody mucous, without faecal matter, tenesmus was marked, temperature never rose above 100, pulse about 104. August 7th the father became similarly affected, the dejections presenting the general appearance of beef brine. August 12th the daughter was attacked, being seized with a chill followed by a temperature of 105°, pulse 130-140, nausea and vomiting. August 12th the

grandmother was also affected, the onset similar to that of the girl.

Collapse came on as suddenly and as markedly as in Asiatic cholera. The girl died on the fifth day after seizure, the grandmother on the seventh, the boy on the ninth. The father, after a slow and tedious convalescence, recovered.

The mother and house servant had persistent diarrhœa, controlled with difficulty, but no dysentery. The farm laborer was early frightened, and left the town. No report of his illness was ever received.

The man that took his place went home at the end of a week, sick with dysentery, but recovered in about ten days. No cases occurred in his family or neighbors.

A sister of the wife that came to assist in the care of the sick was seized with dysentery, but recovered after six weeks' severe illness. Her children were ordered removed, but the two youngest, that were constantly with their mother during the day before removal, were attacked on the same day with a mild form of dysentery.

The cause was evidently local, the type of the disease once established mildly contagious.

The following facts as to the cause are obtained from the report of Dr. Raymond of Brooklyn, N. Y.:

Examination of the spring used to obtain drinking water excluded that as a possible source of the disease. The surroundings of the spring were unquestionably good, and analysis of the water as received in the house showed it to be of exceptional purity. The window curtain was examined for arsenic, but no trace of mineral coloring matter found.

The cellar was very damp, and the soil beneath and immediately adjoining the house damp from the free water supply brought into the house from the spring—five pints per minute. In case of heavy rains, water runs into the cellar through the rear wall. How much this water is contaminated from the privy vault is not easily estimated. The vault had not been emptied for twelve years, and was far from being full, hence there must have been considerable soil saturation, as the privy was constantly used.

The stream from which the ice suspected was gathered runs through a field alongside the road. This field has for fifteen years been used as a running place for pigs, and swine were wallowing in the stream at the time it was examined.

The ice water on analysis showed:

Free ammonia, parts per million,	.08
Albuminoid ammonia, parts per million,	.09

The water was of a greenish color, with light colored organic particles in suspension. The stream also apparently receives drainage from house waste, and possibly sewage from the privy-vault before mentioned. The analysis and general character of the ice water show sufficient cause for the production of the symptoms described. The ice water at Rye Beach contained considerably less ammonia.

Albuminoid ammonia is a reliable indication of contamination when excessive. When accompanied with but little free ammonia, and no evidence of chlorine, its presence indicates vegetable decay, the products of which contaminate the water. When the albuminoid ammonia amounts to .05 parts per million, the quantity of free ammonia that accompanies it must be considered in estimating the amount of contamination.\* A large percentage of albuminoid ammonia may exist, .10 per million even, if there be no free ammonia present. The presence of the chlorides indicates contamination from animal decay, when present with the forms of ammonia. Taken together, the large percentage of both free and albuminoid ammonia in the ice water proves the excessive contamination of the water from which the ice was collected.

---

\* Wanklyn water analysis.

---

---

SANITARY

AND

UNSANITARY CONDITIONS

OF THE

SOIL.

---

BY

PROF. C. A. LINDSLEY, M.D.,

MEDICAL DEPARTMENT YALE COLLEGE, DECEMBER, 1879.

---

---





# SANITARY AND UNSANITARY

## CONDITIONS OF THE SOIL.

---

That "health is wealth," has become an accepted axiom: and hence the things which make for the protection and preservation of health are by the intelligent and considerate man put on a level in his regard with whatever helps him in the pursuit and possession of wealth. It is proposed in the following brief paper to consider how the health of people may be influenced by the conditions of the soil upon which they live and which immediately surrounds their dwelling-places.

The practical importance of fully appreciating the extent to which various conditions of the soil may influence the physical well-being of persons living over it, is becoming more and more recognized.

It has been observed almost from time beyond compute, that the health of men is influenced by those varying conditions which, in general terms, are called the influences of climate. But the careful study of the soil in its varying conditions, and of the pollution to which it is liable, as they are related to human health, has only in comparatively recent times received the systematic investigation to which its vast importance entitles it.

### RELATION OF THE SOIL TO THE AIR AND TO WATER.

The popular mind has been content in the belief that some occult peculiarities of the *air* of different regions repair or impair, as the case may be, the health of those who breathe it. And they speak in a vague way of the air of this country or that as being *bracing* or *debilitating*. Pure atmospheric air is a fluid of a definite chemical constitution, varying chiefly in the amount of aqueous vapor it may contain and in its temperature.

Any peculiar influence which it may exert upon the health of men must therefore be attributed to the presence in it of some elements not native to its constitution. Whence does it acquire

these foreign elements? In any given locality it is possible that they may be brought from long distances, as they are transported by the winds; but the ultimate source or origin of them, it is reasonable to believe, must be found largely, if not wholly, in the earth at or near its surface.

It has been long recognized that the air of certain places is poisoned with an effluvia from the ground called *malaria*, but it has not been so generally understood that other deleterious agencies may have a like telluric origin.

It will be interesting, therefore, to inquire what relations the soil holds to the air; and also, because all the water consumed by man first descends from the upper air, and before it is used flows upon the surface of the ground or is filtered through it, the inquiry is scarcely less interesting respecting the relations of the soil to water.

The late Dr. George Derby said, "The well are made sick, and the sick are made worse, for the simple lack of God's pure air and pure water." This sentiment was not original with Dr. Derby, nor is the statement a novel one. More than four centuries before the Christian era the cardinal formula for health was announced by Hippocrates in these words: "Pure air, pure water, and a pure soil," and to-day we cannot improve it. Aye, even three thousand years ago the dangers of a polluted soil were fully recognized in the sanitary laws of Moses, from which it would appear that such abominations as our modern privy-vaults and cesspools were not tolerated in the camps of Israel. For we find recorded in the sanitary code to which they were subject in their journey through the wilderness, the following law:

"Thou shalt have a place also *without* the camp, whither thou shalt go forth *abroad*; and thou shalt have a paddle upon thy weapon; and it shall be when thou wilt ease thyself *abroad*, thou shalt dig therewith, and shalt turn back and cover that which cometh from thee."—Deut. xxiii, 12, 13.

It is proposed in what follows to set forth the danger of ignoring the qualities and conditions of the ground at and near its surface; and also to show how, by our own practices, we contribute largely to its defilement and interfere with or wholly prevent the processes which Nature, in her infallible wisdom, provides for its purification.

## THE ACTIVITIES OF NATURE IN THE SURFACE GROUND.

The popular mind is wont to regard the poetic allusions to the absolute rest and silence of the grave as equally descriptive of everything beneath the sod.

A little reflection and the application of our common knowledge of facts will show us that a series of active processes are going on in the subsoil which, if we have not before observed them, will excite our astonishment. Instead of passive inaction, we find that Dame Nature is no less busy in her activities beneath the surface of the ground than she is above it.

If one will fill a pail with soil from the driest part of the garden, he will find that when full of earth he can still pour into it a considerable quantity of water without causing it to overflow. In this case the water occupies the interstices between the particles of earth. One cannot pack the earth so closely but that such spaces will exist, and when they are not filled with water then the air will fill them. Again, it is well known that some animals, buried alive in the ground, continue to live for days, breathing only the air they can inhale from the ground itself. Even stones and rock contain air, and whether it be air or water in the ground, they are never stagnant, but always moving in currents up and down or to and fro, working their splendid chemistry in God's great laboratory.

They are always active, forming new combinations with whatever they may meet or dissolving old ones; oxidizing the products of decay and rendering them harmless, and generating vast volumes of carbonic acid for new vegetable life. So accurate, too, are the adjustments of Nature to her purposes and results that both animal and vegetable existence is preserved and maintained.

Notwithstanding that each day all the people in the world might be asphyxiated by the carbonic acid made in the soil, or poisoned by the noxious gases of decay, yet we are preserved from either calamity—on the one hand by the appropriation of the carbonic acid to the processes of vegetation, and on the other by the oxydizing action of the all penetrating atmosphere.

If now we expose the pail of earth and water for a few days to the rays of the sun, we shall find that the water has disappeared, and the air has again entered to fill the space it occupied. In this fact we have an illustration of another powerful element intimately concerned in the activities going on underground, namely, heat. Air, water, and heat are the chief factors of motion in the never-

ceasing unrest in the soil beneath our feet. Their influences upon each other are incessant and perpetual. The penetrating rays of the sun evaporate the water and give place to air, to a depth greater or less according to the degree of heat and its continuance. Thus ever changing relations of temperature, moisture, and ventilation are produced in the soil, due chiefly to the alternations of day and night and of the seasons, and to the porosity of the soil. There are therefore constant currents of radiant heat passing and repassing to a very considerable depth in the ground.

As a motive power, heat is unrivalled; even slight changes of temperature produce action. It is ever working; the elements obey its bidding in new combinations and decompositions and ferments.

#### THE GROUND WATER.

A scarcely less potent factor of action is found in the always varying presence of water near the surface. This, too, is in motion, not rapid, but yet always moving. The source of supply is the rainfall. From the clouds it descends upon the earth. The lesser portion—storm-water—flows upon the surface into streams, and thence onward to the ocean. A larger part is received into the ground. It is this we are interested to watch. It sinks down through the porous layers of loam, sand, and gravel until it reaches a stratum of rock or clay which is impervious. But as the surface of this water-proof stratum is not level, but is as undulating as the ground that covers it, reason and fact agree in finding the accumulated water below the point of saturation slowly moving onward, but in a lateral direction now, through the porous superstrata to some lower outlet. It does not stagnate. It is ever in motion, seeking its level, running in slow currents underground, usually towards some river or the ocean, in obedience to the same laws that control its less resisted progress on the surface.

What we call dry ground has much moisture in it, varying in quantity, with a varying amount of air, in all degrees to the point of water saturation. Below this point the ground is filled with water. If a pit is sunk below it, water fills the cavity and constitutes the familiar "well" in common use. The well proves also the fact, already mentioned, that the ground water is in motion; for no one believes that good well-water is stagnant water. It is also within the experience of all men that the water in wells rises and falls with the changing seasons; and many surface springs flow full or fail under like conditions. Thus we have incessant motion in the

soil water, following laterally the incline of the water-tight layer of clay or rock upon which it lies, rising and falling with the supply from the rain clouds, and always ascending through the ground towards the surface by the forces of capillary attraction to moisten the soil and supply the wants of vegetation.

#### THE GROUND AIR.

Above the level of the soil water the atmosphere enters, and plays its part in the unseen and noiseless activities of the underground. This, too, is in motion; and constant currents of air permeate the soils passing through it in various directions, going in and out of it, and so by frequent interchanging with the upper air contribute the powerful influence of direct ventilation to sweeten and purify the surface soil.

The causes which produce motion in the ground air are diversities of temperature at different depths, the force of the wind, barometric pressure, displacement by rainfall and movement of ground water, and finally the law of diffusion which governs the action of all gases. The force with which the wind presses into the ground is apt to be under-estimated. A brief wind equals a pressure of over a pound to the square foot of surface, and a hurricane fifty pounds, and this upon a level and unobstructed surface; but if it blows against a hillside, or its current, turned against the ground by some resisting obstacle, the pressure is vastly increased.

How much then do we mistake the true character of the ground we live upon when we regard it only as an inert mass of loam, gravel, and stone. Heat, water, and air are always inseparable elements in its constitution. The conditions under which their ceaseless circulation goes on in the subsoil are not one whit less potent for good or evil to man than are the influences which affect his health above ground. The surface of the earth is the natural and necessary receptacle of all decaying and dead matter, of all worn-out material, of all forms of refuse dirt, and filth, of whatever kind or nature. If they remained where deposited in inert masses, unchanged and insusceptible of change, the accumulations would soon exceed all computation, and the surface of the earth would rapidly become occupied with them and be rendered uninhabitable. But Nature defeats this result, and secures the safety and maintainance of animal and vegetable life, and perpetuates the habitation of the earth, through the instrumentality of those energetic actions in the soil which are above described. Heat and moisture promote the speedy



decomposition of all organic matters, and the elements of which they are composed are variously appropriated. The gases of decay by the universal law of diffusion are evaporated and dissipated in the vast ocean of the outer air. Other elements are oxidized by the oxygen of the ground air, and still others are revived through the mysterious processes of vegetation. Thus all, by the harmonious action of these various agencies are disposed of speedily, safely, and without waste in accordance with the economy of Nature. We observe then that the rain, the sunshine, the winds, and an active vegetation are the potent and all-sufficient agencies by which the ground is purified and made a wholesome place for man to live upon.

#### MAN'S INTERFERENCE WITH THE INTERESTS OF NATURE.

This view of the subject leads directly to the practical query : Do our houses and homes harmonize or conflict with these natural hygienic processes? How does the ground upon which a city is built stand related to these grand operations of Nature?

In the first place, vegetation is destroyed and its potent energies in consuming the products of decay are lost. The surface of the ground is so covered that the influence of the sun-light and sun-heat is either altogether lost or greatly modified, and for the same reason the rain-fall reaches the surface in streams as it is shed from roofs and pavements, and therefore cannot diffuse itself through it uniformly, and thus the condition of moisture is greatly changed, and the underground water courses are altered. Very often the result of such artificial inventions as the cesspool, the cistern, the privy-vault, and the cellar is to unite them together into a sort of system of underground drainage. Again, the soil is so completely covered by structures impervious to the air that the atmosphere is excluded, the winds are diverted in their course and the ground does not feel their pressure, and thus the purifying influence of underground ventilation is greatly interfered with or wholly prevented. The constant interchange of the upper and the ground air is impossible, and the latter becomes stagnant and corrupt. Such underground ventilation as is possible under such conditions is largely out of proportion into and through the cellars of dwelling houses. The stagnant air, contaminated with the gases of decay from the filth with which the ground is over-charged, is sucked through the cellars of houses as the most accessible permeable places of escape, and house poisoning is the inevitable result. That such is the fact

ordinarily, whenever the ground surface is rendered air-tight from any cause, has been often proved. It happened within the observation of the writer, a few years ago, that a main gas-pipe laid through the middle of a city street sprang a leak in a winter night, and the discharge of gas was so great that, not finding escape through the frozen ground, it permeated latterly through the soil under the air-tight frozen surface forty or fifty feet to the cellars of the houses nearest, and escaping there, so poisoned the air that the sleeping inmates were carried out of their houses in the morning by their neighbors, some of them in an unconscious state. Three houses were thus poisoned by the gas, and neither of them had ever had any pipe connections with the main pipe in the street. If the leak had occurred in the summer, when the ground was not frozen, it would have occasioned little or no annoyance to the families in those houses, because the escaping gas would have found its way directly to the upper air. But the incident illustrates satisfactorily the evils of sealing the ground about our homes with an air-tight covering, and leaving our cellar bottoms pervious to the passage of all the noxious gases generated in the filth-laden soil. And yet it is within the experience of most observing people to have seen a cesspool and a privy-vault sunk within a few feet of the house-cellar, and the ground all about them, and all the intervening space up to the house foundation, covered with an impenetrable coating of asphalt pavement. Where else can go the noxious gases that will invariably be generated in those filth-pits than directly to that graveled-bottom cellar? And what else can happen to the residents of that house than sickness and the sympathy of their neighbors for the mysterious dispensations of Providence? And so it is plain that by the erection of human habitations, whether collected in a city or isolated in the country, the natural relations of the surface-soil are necessarily altered.

The hygienic processes which Nature institutes for soil purification man interferes with or prevents. Nor only so, but heedless of the dangers of such interference, he aggravates and multiplies them by constantly storing about his home, in as close proximity to it as possible, the increasing accumulations of filth which the necessities of domestic life produce.

#### HOUSE-POISONING AND WELL-POISONING.

When a man provides a home for himself and his family, there are four things which he immediately does to the soil about it as

necessary, he thinks, to the appointments of his home. First he digs a cellar, over which he builds his house; next, he digs a well for the water; then he digs another excavation, not so deep as the well, into which he pours all the liquid filth of housekeeping; and finally he digs still another pit, and into this is daily dropped for storage the excremental discharges of all his family. These excavations are for convenience placed in close proximity to each other. Commonly a few feet, say fifteen to fifty, will measure their separation. Indeed, instances are frequent where one or more of these are included within another. I have known a house in the city of New Haven, occupied by two families, in which these arrangements were so *very convenient* that two cesspools and the well were all in the cellar, while two privy-vaults were only just outside the cellar walls, and they were all serving their special purposes daily, for both families.

This instance is not selected from the habitations of the ignorant and poverty-stricken. But as indicative of the intelligence and social position of the occupants of the house, they paid an annual rent of \$1,000 for a dwelling only, which price it readily commanded because of its conveniences and its respectable location.

We would naturally ask how the underground currents of air and water may affect the water in the well and the air in a house so situated. What pleasant virtues does the well derive from the mingled fluids of those cesspools and privy-vaults between which it is so conveniently located? What invigorating and health-giving properties are imparted to the atmosphere by the fragrant exhalations which the warmth of the cellar extracts from its saturated bottom? Surely such questions require no formal answer. In illustration, however, of what happens under like conditions, I quote an abstract from a letter recently received from a physician in a neighboring town.

"I have a family under my care in which for some years past there has been a good deal of sickness. Of late it has in part assumed something of a malarial character—there has been some sore throat of a catarrhal nature, no diphtheria, but it has mostly assumed an indefinite type, slight fever, furred tongue, loss of appetite, and more or less prostration. The family occupy a fine place nicely located—surroundings neat, and at first sight sanitary conditions seemed to be all that could be wished. On examination, I found back of the house a cesspool, well, and privy-vaults.

The latter were both under a roof connected with the house. The privy-vault is nineteen feet from the well, and ten feet from the cellar. The cesspool is twenty-five feet from the well, and but eight feet from the cellar. It is tightly covered at the top, and has no ventilating pipe except that connecting it with the sink in the kitchen, in which there is no trap." He further states that *no unpleasant smell* has been observed in the house and they think the *water is excellent*, and concludes with asking naively if I "*should suspect any trouble from either of these sources.*" It seems impossible to doubt that house-poisoning must occur from such conditions without the demonstrative proof that the inmates of the house were so poisoned.

Another source of poisoning from unsanitary conditions of the soil is through the drinking of well-water. The purity of our wells from the filth dissolved in the rain water, as it passes through the ground to the wells, must depend wholly upon the filtering and purifying process of the soil itself. Fresh earth is an unrivalled filter. But this function depends greatly upon the freedom with which the air circulates within it, the purification being nearly in all cases a process of oxidation. A few feet of fresh earth under natural relations will remove all the color and odor from the foulest slops in the kitchen yard. And if time enough is allowed, and space enough through earth provided, it will effectually "transform the foulest and most noisome sewage-water into the crystal springs which poets celebrate in verse, and which even religion takes as the type of its best gifts to man." But there are limits to its purifying powers. It is possible, too, to destroy its qualities as a filter. What filtering power can the ground preserve in the back yards about our wells if we keep it saturated year after year with the sewage from our kitchens, and the excrement from our persons? Filled with the nastiest of filth, it is impossible that it should make the water that passes through it pure. It may indeed render it free from color and smell, but do not forget that *clear* water is not necessarily *pure* water. A city well may give no warning to any sense; its waters are refreshingly cool, they are clear and sparkling, free from all solid particles, without odor, and yet they may be laden with the germs of the deadliest pestilence. Such cases have happened a thousand times. In the cholera epidemic in London in 1866, one grain of sewage defilement to the gallon of water supply was found to be directly connected with over 70 per cent. of the whole mortality.

## HOW WELLS ARE DRAINS.

Practical men know that land drainage is effected by cutting a ditch a few feet deep across the field to be drained, and that even in very compact soils a cut five feet deep will take the water from the adjacent ground to a distance of twenty-five feet on either side. So too, with a pit dug in the ground, the water from the surrounding ground would gravitate into it from as great a distance by the same law, although the operations of nature are not changed by the name we give to such a pit. Therefore, if we call it a well, and use it for a well, it still performs the functions of a drain all the same as if it was called a drain, and dug for a drain. The fact therefore cannot be disputed that *every well is a practical drain* in good working order, and takes the water of the surrounding ground from an indefinite distance in proportion to its depth, and the porosity of the soil. With this fact in mind it is not pleasant to think of the cesspools and privy-vaults within drairage distance of the wells that supply our drinking water.

## WATER-TIGHT FILTH-VAULTS.

The dangers of well-poisoning and house-poisoning through the ground from these pits of pollution have so impressed the Boards of Health of some cities that they have ventured to anticipate the public intelligence on this subject, and enact laws requiring all underground reservoirs of filth to be made water-tight, and forbidding the construction of any more leaking cesspools and privy-vaults. As was expected, the enforcement of this law has met with decided opposition. It seems incredible that so many otherwise intelligent people should be so ignorant or reckless of the dangers of those soil pollutions, that they regard the law oppressive and wrong, simply because it involves some additional expense for more frequent emptying of such vaults, and removal of contents. The very objection itself is proof of the evils of loose walled vaults, and so of the need of such a law.

The objectors say in effect:—"We do not wish to have these filth-pits, at our back doors, tight—we like to have them leak; the more they leak the better. The more the filth about our houses soaks into the ground the better we like it, because then it don't cost us anything to carry it away." They do not count the cost of having typhoid fever, malaria, cholera infantum, diphtheria, etc., in their families. Yet a volume could be filled with demonstrative



proofs that these diseases and others have been engendered and propagated by exactly such soil pollutions.

#### WELL AND CELLAR CONNECTIONS WITH PRIVY-VAULTS AND CESSPOOLS.

Every city will afford hundreds of instances in which direct communication exists between these vile vaults and the well and cellar, to defile the water and pollute the air of the house. In the construction of one of the railroads running into New Haven a grade cut was made through a hill, and in one bank of the cut, when the writer last visited the spot, there might be seen several little streams of dirty water oozing through the ground from a cesspool more than fifty feet distance.

Where water goes one day it is more likely to go the next, and continual going in one direction soon establishes a channel of direct communication, so that in time all the liquids flow through it. This is frequently the fact when an outlet lower than the bottom of the cesspool exists, whether it be a railroad cut, or a well, or a house cellar.

Several years' experience as the health officer of New Haven has brought to the writer's notice many instances where such relations existed between the cesspool and the well. These were most conspicuous after the weekly washing day, when the water drawn from the wells, by its smell and appearance (I did not taste it) gave unequivocal evidence of being largely charged with the products of wash tubs after useful service in purifying the family linen.

#### THE SUBSOIL AS A FILTER.

It is quite certain we are disposed to put too much confidence in the purifying powers of the soil. There is not only a limit to its powers, but there are also conditions essential to its action as a purifier. The water of slops and sewage and human excrement buried near our wells will not be made pure and fit for drinking by filtering through a few feet of earth except under most favorable conditions. What are the conditions favorable to its purification? The great and most essential requisite is a free ventilation of the ground; instead of shutting out the air by an impenetrable covering, the utmost freedom of air circulation should be afforded. Because, as the chemists tell us, the air acts through its oxygen upon the impurities which the soil strains from the dirty water, and oxidizes or burns them. Again, it is obvious that to get the best



results as a purifier, the ground charged with impure liquids should have an interval of time between its wettings long enough to become so dry that the atmosphere may follow the receding liquids and destroy what the filter has strained from them. But if no interval for drying is permitted, if the ground is kept constantly wet to saturation, then it is quite certain the air cannot enter into it; the impurities are not oxidized but accumulate; the ground no longer acts as a purifier, but on the other hand the increasing quantities of filth incorporated with it takes on its own chemical action, and becomes prolific in the production of mephitic and poisonous gases, which ascend to upper air to work their unwholesome action upon all who breathe them.

It is easy to understand which of these conditions is maintained by these filth pits. The exudation from their bottom and sides is nearly constant; the intervals of supply are so regular and frequent that no opportunity occurs for the air to restore the filtering power of the soil. Thus the fouling process goes on, and after some weeks or months there is no clean earth between the well and these pestilential sources of supply to it, and every drop of water from them carries with it its atom of filth.

The most elegant and tasteful home that wealth and art could provide would be defective in the most essential quality if it was not also a *sanitarium*.

It is simply astonishing to observe what trouble and expense people will incur to provide themselves with what they call the comforts of a home, while at the same time they are so indifferent to unsanitary conditions, which will make their home most uncomfortable through the sickness and death which they cause.

If we could for a time enjoy the powers of vision which the clairvoyant professes to have, and could peer down into the subsoil about some of our homes, a revelation would be made which now we little realize. Unsuspected infiltrations of filth, obstructed drains, stagnant water, and stagnant air, subterranean channels radiating from wells and cellars to the various filth-pits by which they are surrounded, would meet our astonished eyes, while many odors of a fragrance not chosen by the perfumer for a toilet use would assault our disgusted noses, and so through our offended senses we might be convicted of living in more dangerous familiarity with filth than the brutes in their natural state.

This state of subsoil nastiness is almost wholly due to the leakings from the cesspools and privy-vaults with which the ground

in every old settled town is honey-combed. It is quite impossible to conceive any more scandalous imputation upon our domestic life than that we are frequent victims of infectious diseases, which we incur through the action of our own excrement, which our extreme filthiness permits to mingle with our air, and food, and drink. The dangers which attend the toleration of these subterranean reservoirs of foulness cannot be computed. Dr. John Simon, the great English sanitarian, writing on this subject, says, "The pathological studies of late years, including eminently certain very instructive researches which Professor Sanderson has conducted, have clearly shown that in the 'common' septic ferment, or in some ferment or ferments not hitherto to be separated from it, there reside powers of disease production as positive as those which reside in the varioloses and syphilitic contagia."

There is but little doubt in the minds of those who best understand the subject that if it were practicable to effect the prompt and complete removal of all excremental matters and all other organic wastes to such distance that we should have no further contact with them, there would simultaneously disappear from our midst certain of our most grave and fatal diseases, especially those of the intestines. We might also reasonably expect relief from malarial diseases which are, with remarkable unanimity of opinion, attributed to emanations from the ground. Unsanitary conditions of the soil are, however, not always due to human agencies. As the subject is better understood by systematic investigation, the fact is developed that in addition to those diseases which find their origin in soils polluted by man, there are also many other diseases the sources of which are found in various natural conditions of the earth's form and substance. The relation of the geology and the topography of places to the health of residents is a large study, and one which demands an extended and patient investigation. Our present knowledge of it is as yet only too general and indefinable to be thoroughly practical, but it is a field of inquiry which promises great results from a broad and intelligent exploration.

For more than a century the prevalence of malarial diseases has been associated in our experience with certain topographical conditions, but almost the sum of positive knowledge of their relations was comprised in the statement that some swamps cause malaria. More recent observations have shown that topography alone is not adequate to explain the etiology of the malarial types of disease :

that they are found to occur under the most varied conformation and character of surface, and that the deeper geological construction and direction of the strata of the earth's surface are intimately associated with their production. As a result of studying the relations of the soil to human health, one conclusion has been reached which may be considered as established, which is, that an excess of moisture in the ground is always unsanitary. There are abundant facts in proof, and the inquiries of Dr. Henry I. Bowditch some fifteen years ago, respecting the connection of wet soils with the prevalence of consumption in New England, have dispelled all doubt about it.

In the foregoing, the writer has had in mind chiefly to present what agencies Nature employs in the ordinary condition of the soil, to dispose safely of the decomposing organic matters, which everywhere may fall upon its surface, and which would otherwise become dangerous to health. In addition also to show to what extent the prevailing habits of domestic life interfere with the intentions of Nature, by preventing those salutary operations which keep the soil pure and wholesome; and how in the most reckless and criminal way we directly render the soil unsanitary and dangerous to live upon.

It is another branch of the subject to study the various conditions of natural soils, in their sanitary bearings, and one which involves a much wider field of inquiry. Its elucidation would call for detailed topographical and geological surveys of large areas, to be followed by equally careful sanitary surveys of the same areas. By the collective classification and comparison of the facts thus obtained, data would be furnished from which there is promise of deducing with reasonable certainty some of the principal causes of the most fatal prevailing diseases; and in that event of pointing out the practical remedies which will materially reduce the death-rate in communities.

There are quite satisfactory grounds for believing that the united results of topographical, geological, and sanitary surveys of extensive areas, carried out by expert and trained observers, acting in concert and by authority, would be the production of a body of facts from which might be determined most important laws of health. This is too great an undertaking for private enterprise, and can only be successfully pursued by governmental authority and aid.

---

---

# SCHOOL HYGIENE.

BY

C. W. CHAMBERLAIN, M.D.,

HARTFORD,

Member of the Advisory Committee of the American Public Health Association, Secretary of the Connecticut Medical Society, etc.,

SECRETARY OF THE BOARD.

---

---



## SCHOOL HYGIENE.

---

The value of any educational process or system is not tested by the proficiency acquired in its methods, nor by the degree of perfection reached in the prescribed course. Nor is it enough to prove the system a success that the utmost possible amount of knowledge and mental discipline have been bestowed within the limited time, unless the training has been in the line of developing a healthy maturity. The ultimate object sought is fitness for the labor of life, a symmetrical development of all the faculties, and such discipline as will enable one readily to acquire knowledge and skillfully to use it ; the ability to concentrate at once and at will all one's energies upon new facts, new ideas, and new situations. The age in which we live is fruitful in changes, and demands the power of ready adaptability to make the best of unfavorable circumstances and conditions and turn them to our advantage. Skill, effectiveness, and endurance should be the resultants,—a body trained to execute the mandates of the mind, as well as a mind trained to know and use its powers. As the body is the instrument or agent through which the mind must work, any system or process that weakens or enfeebles the body, inducing an inaptitude for manual labor, premature invalidism, lessened powers of resistance to depressing influences, and an imperfect organization, is in so far a failure. It is a grave and serious concern to the State that the large proportion of its population, in Connecticut about one-third, engaged in going to school should during the ten or twelve years thus employed, be surrounded by no avoidable unsanitary conditions and subjected to no influences that tend to induce imperfect physical or mental organization, to lower vitality, or to lay the foundation for disabilities in after life that shorten the limits of effective life work. This period included in school-life is the most impressionable, is indeed the formative period, and any depressing influences are much more effective here than during any other period. "The young lives are finer tests of foul air than the older and perhaps



acclimatized population." The capacity for resistance is in inverse ratio to the rapidity of growth.

A very much larger proportion of invalidism, ill health, disease, and death are due to bad hygienic influences than is commonly supposed. Damp houses, undrained premises, unventilated rooms, impure water, badly placed outbuildings, and carelessness in the disposition of the garbage and filth necessarily resulting from domestic life, have a closer and more intimate relation to ill health, disease, and death than is generally recognized. When these truths are realized and acted upon, the results soon make apparent the reality and value of sanitary laws. Although mankind are naturally careless, negligent, and inclined to procrastinate, still we find hygienic improvement to advance pretty regularly with the advance of knowledge and intelligence.

The State, in a certain sense, makes the children its wards, as education is rendered compulsory; hence not only should all preventable unsanitary conditions be removed, using the term in its widest sense to include both mental and physical relations, but should train the pupils in right methods of guarding life and health by obedience to sanitary laws, by which much inherited invalidism and evil tendencies may be obviated. The most decided results could be achieved by furnishing the essential requisites for a vigorous, healthy physical development and maturity, and conforming educational methods to physiological and hygienic laws. A vast amount of sanitary reform would be the necessary resultant of such a course. So far from this so desirable a state of affairs existing, it is unfortunately but too obvious that the reverse is the truer picture, and that the school-rooms in their present condition, and the prevalent systems of education, to say the least, imperil and endanger health.

The question then arises: can a symmetrical mental development and discipline be secured without infringing upon the conditions essential to a harmonious physical development and maturity? This involves the idea that brain-work is necessarily exhausting and depressing as compared with other forms of labor; the contrary, however, is the truth; exercise of the mind, if rightly directed, invigorates the body and conduces to health and long life by increasing the volume and vigor of the brain, the storehouse of energy for the whole system. Such exercise, however, must be suited to the age, development of the brain, and consequent mental receptivity of the child, must be regular, not unduly

forced, and must be kept free from worry and anxiety. In the young especially the evils of worry and anxiety are noticeable. By emulation, competitive study, or penalties, the active, impressible brain of the child is harassed and work becomes depressing. The studious, faithful, conscientious child, who needs restraint rather than the spur, is the one injured; the careless, unimpressible child, of exuberant animal life, who shakes off all care as soon as he leaves the school-room (if, indeed, there were any to shake off), for whose behalf these methods were resorted to, receives no injury, as he takes no heed. The results of the forcing system are a mental discipline that has its fruition in what should be its springtime, and a mental development that has reached its acme ere the educational process is completed. Such brains may be quick but are not productive, and are, as Kingsley says, "apt to mistake capacity for talk for capacity for action, excitement for earnestness, vehemence for force, and too often cruelty for justice." By physical culture is not meant special training in any one direction, which is indeed to be deprecated, as when a muscular oarsman finds he has developed a diseased heart, but that due attention be paid to that exercise of the different bodily structures essential to growth and development; that over-tension and cramping restraint be avoided, and the younger the children the more frequent the intermissions and varied the mental exercises.

Every occupation has its peculiar dangers and liabilities to ill, and the occupation of going to school is no exception. To a certain extent it violates the essential conditions of healthy child-life, which demand ceaseless change of position or restless activity, constant change of attention, and frequent periods of repose and sleep in case of the very young. This leads naturally to the first violation of physiological law in educational methods, which relates to the time for mental effort, the general law being that study and all mental work shall be adapted to the age, and not be in advance of development. The time selected by the physiologist and hygienist for the commencement of systematic education is when the child has reached seven years. This is not arbitrarily selected, but rests upon physiological laws that cannot be violated with impunity.

The source of mental energy is in the gray matter of the brain, and whatever may be the theory of mental action, the brain furnishes the conditions necessary for the manifestation of mind, and that through the gray matter. Now up to the seventh year

the brain, while growing at a more rapid rate than at any other period of life, is comparatively deficient in gray matter, but the white matter related to the perceptive faculties predominates. Up to this time, therefore, the perceptive faculties are sufficient to keep the mind fully occupied in acquiring the knowledge to be gained by observation. While the gray matter of the brain is but partially developed, mental effort involving the reflective faculties and abstract ideas should not be allowed. "All formal labor of the mind required before the seventh year is in opposition to the laws of nature, and will prove injurious to the organization." The superintendent of the schools in St. Louis states that children that enter the schools at eight years make nearly double the progress that those make that enter at five, and similar testimony might be cited indefinitely.

There are many physiological reasons for selecting this age for the commencement of regular education, the lower vertebræ of the spine, upon which the upper portion of the body rests when in a sitting position, are then ossified and not before. The proportion between the upper and lower portions and the trunk is reached during this year. During the seventh year the body commences to have a uniform, steady growth; before this period different portions increase with different rates of growth.

The rapid growth of the brain implies an increased blood supply, and explains the greater nervous susceptibility of children. The nervous system in childhood, besides presiding over the functions that maintain life and provide for the repair of the daily waste of tissues, as in adults, has in charge those of growth and development, *i. e.*, the production of new functions, and the mechanism for their exercise. Now if its energies be unduly taxed in mental labor, it draws upon those which should be reserved for digestion and assimilation; these processes being interrupted, the brain is no longer supplied with nutritious blood, and development is checked or perverted. The reserve force is much less in childhood, as it is required for the processes of development. The process of repair in the brain takes place only in sleep, as well as its growth, hence a greater amount of sleep is required and at more frequent periods than in the adult. If denied, nervous irritability results, followed by exhaustion or depression. This nervous irritability and its expression are too often considered as requiring and receiving punishment, as it leads undoubtedly to infractions of discipline. There is one other point in this connection: the constant

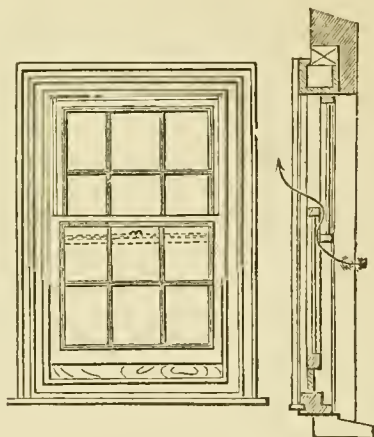
effort to accomplish a task that is beyond the mental powers weakens the brain and injures mental capacities permanently.

One of the most essential requisites, however, for a healthy and vigorous physical development is one but poorly supplied by the average school room, and that is pure air. This is essential to good mental labor, to work that shall task the powers of the brain to the utmost, and at the same time invigorate and strengthen it, and indirectly the physical frame.

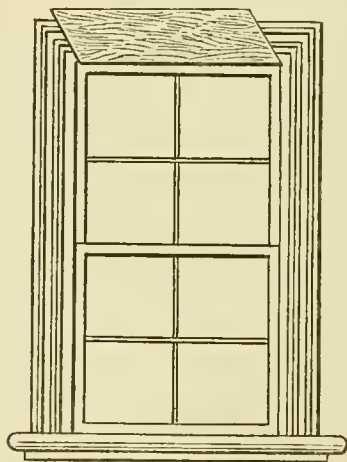
Children breathe with nearly double the rapidity of adults, and hence are more susceptible to the ill effects of impure air. It is claimed by some that small children do not require so much air space as the older, but this is erroneous, as the rapidity of breathing compensates for the smaller volume of air respired. At each breath we inhale carbonic acid, twenty-five to forty ounces, every twenty-four hours, we exhale watery vapor, and fetid organic vapors, the products of changes that have taken place in the system; these latter give the offensive smell to a close, ill-ventilated room when occupied. The air is also contaminated by exhalations from the skin, and by emanations from soiled clothing; the latter no small item in a crowded room. The dust of the school room is peculiar, the fine particles of chalk from the crayons used at the blackboards constitute a special impurity; imperfect janitorship often adds others from the accumulation of several days, around the desks.

The use of windows to ventilate the school-room during the session, is very objectionable, as the sudden exposure to a draft of cold air "slays like the stroke of a sword," while the impure air produces ill health and undermines the vital forces more slowly. The following illustrations show two methods easily available, that can be arranged at slight expense where the authorities cannot be prevailed upon to ventilate the building systematically. A strip, the length of the window-frame and width of the opening, should be placed under the lower sash. This should be as thick as the lower sash, and well fitted to its place. The lower sash is raised, this strip put in place, and the sash shut down, resting upon the strip. The air now enters between the two sashes, and is given an upward direction, thus avoiding a draft,—the direction is indicated by the arrows in the side section. The other plan is to nail or fasten securely a strip of board at a sharp angle to the top bar of the upper sash, and then lower the sash. This, of course, should be of the length of the sash, the width determined by the volume of air desired. More

air is admitted by this method, an upward direction is given to it, and direct draft avoided. By these means the air supply can be



much improved. A test for the carbonic acid, which is a fair measure for all the impurities, is easily made. The normal pro-



portion in air is eight parts in ten thousand. To test for excess, take an eight-ounce vial, fill with rain water, preferably, and empty



out the water in the room the air of which you wish to examine. As the water flows out, air passes in, and the bottle becomes filled with the air of the room. Pour into the bottle half an ounce of clear lime water, obtained easily at any druggist's; cork, and shake thoroughly. If no milkiess or turbidity results, the air does not contain more than eight parts carbonic acid in ten thousand of air. If a six-ounce bottle is used, with half an ounce of lime water, and gives turbidity, there is eleven parts carbonic acid in ten thousand of air. If a two-ounce bottle show turbidity, it would indicate over forty parts instead of eight. Thus the quality of the air can be tested. Lime water can be obtained from any druggist, or easily made. Pour cold water over unslacked lime; let it stand over night; then carefully pour off the clear water. More water can be added to the lime, as only a certain per cent. is dissolved. This is a fair test of the quantity of impurity in the air, although there are many deleterious substances that are not indicated at all by the proportion of carbonic acid. Ammonia is tested for by a paper prepared as follows: Evaporate tincture of logwood to dryness; dissolve the residue in ether; dip strips of filtering paper in this. Ammonia gives these strips a brownish tint. Sulphuretted hydrogen is best detected by strips of filtering paper, dipped in a solution of sugar of lead, and exposed, *wet*, to the air of the room. The gas turns the paper black. The test is a very delicate one; very small quantities are detected. The absence of ozone in the air indicates a large percentage of organic matter. Hozeau's test is as follows: Soak litmus paper of a neutral tint in a dilute solution of iodide of potash. The ozone sets the potash free, which turns the paper blue. A person can become habituated to the endurance of a vitiated atmosphere,—a process which, while it trains a child to live on impure blood, trains him to live a poorer and feebler life.

#### QUANTITY OF AIR REQUIRED.

To preserve the air in a reasonable degree of purity, from 200 to 300 cubic feet of air space and 25 sq. feet of floor space are required for each scholar. This is based on exact mathematical calculations of the amount of air devitalized, and implies constant change by ventilation. As the smaller children breathe with greater rapidity, their requirements are about the same. In the worst examples in this State I found  $4\frac{1}{2}$  square feet floor space, and less than 50 cubic feet air space, and no systematic ventila-



tion. It is only in the buildings lately constructed that this standard is nearly reached, usually in the cities. The evils of impure air are too well known to require discussion; the statement is enough. In England and Wales the excess of deaths in the school stages of life amounted, upon examination, a few years since, to fifty thousand annually. These, to a greater or less extent, are chargeable to the unsanitary relations of school life.\* The evil of over-crowding is a common one in all States, especially in cities.

The discussions concerning the New York City Schools furnish a striking commentary on this point. The subject is very comprehensive, and I hope to discuss it more fully later. There are, however, several points that can well be presented in a preliminary paper like this. Dyspepsia, sleeplessness, headache, nervous irritability, neuralgia, and general depression are some of the evil results of overtasking and bad ventilation.

#### HEATING.

Nearly as imperfect a condition often exists with reference to heating as to air supply. Sudden excesses of heat, and then exposure to direct draft from open windows, and the contamination of the air by carbonic oxide and other gases, are prevalent evils. The dryness of the air constricts the depth of inspiration, and predisposes to lung disease. Virchow attributes most of the pulmonary diseases of children to over-crowded rooms, changes of temperature in passing from hot rooms to cold stairways or the outer air, to the dust of the school-room, and the impaired respiratory movements induced by prolonged sitting.

One of the best desks I have seen is that in use in the Chauncey Hall School, Boston. The desk is at an angle of  $23^{\circ}$  for writing, and so constructed that it comes within an inch of the body. The lower section turns back with a noiseless sliding joint, making a book-rest at an angle of  $45^{\circ}$  for reading or studying. The interior of the desk is open to inspection when the lower section is folded back, affording no chance for books or slate to drop, or for untidy desks. The seats were arranged with reference to the natural curves and outlines of the body, preventing pressure on the large nerve of the limbs, which is a common fault and produces sciatica. A most excellent rule obtains here, the neglect of which has been productive of much life-long ill health: the intermediate pupils

---

\*Chadwick on Sanitation in School Stages of Life.

are sent to the highest floors instead of the older pupils. The recommendation is most emphatically urged that this wise course be adopted in those buildings that have several pairs of stairs to climb. The pelvic derangements that are caused by this excessive stair-climbing have in many instances destroyed health for life. While the construction of lofty school buildings is to be condemned in a sanitary point of view, one great evil may be thus partially prevented.

## DESKS.

The matter of seating scholars and the height, size, and adaptation of the desks to the requirements of the scholar should be considered. The following table is by Dr. Guillaume—11 Swiss inches being equal to 13 English inches.

feet.	Height of pupils.		feet.	inches.	Desk. inches.	Seat. inches.	Back. inches.
	inches.						
3	6	to	3	9	15.8	9.5	11.9
3	9	"	4	2	17.0	10.3	12.9
4	2	"	4	5	18.1	11.2	14.0
4	5	"	4	8	19.2	12.2	15.0
4	8	"	5	1	20.4	13.1	16.1
5	1	"	5	4	21.6	14.1	17.2

## EYE DISEASES.

The increase of near-sightedness is marked in America as well as in Germany and other countries. The evil is caused by a faulty management in lighting the building, faulty desks, imperfect light or too intense. The direction of the light is also of great importance; too often the pupils receive light directly in their faces, or cross lights; the black boards, too, are often imperfectly lighted. The size of the windows should bear a direct proportion to the floor-space, from one-quarter (Burnett) to one-sixth (Lincoln) of the floor-space. It is best to have the light come in from behind, next best from the left side. Light gray tints are the best for the interior walls.

## CONTAGIOUS DISEASES.

A large class of diseases that are peculiar to childhood belong to the communicable or infectious class, hence the propriety of closing schools upon the appearance of anything like an epidemic. Carelessness in this respect has often been productive of the greatest evils. A still greater protection would be afforded if physicians

were obliged to report to the Health Board of the city all cases of malignant communicable disease. This is done in Brooklyn, N. Y., Boston, Mass., and some other places. Those infected might then be restrained from going to school, or to any places of public resort, and thus from becoming carriers of contagion. Epidemics of diphtheria have in many instances been spread through the medium of schools, the patient often returning before danger of communicating the disease was over.

This paper is presented to prepare the way for a more complete presentation by a brief statement of some of the more salient points. The school system of this State is so excellent that greater confidence is felt in discussing those points where, as in common with all, improvement can be made. The Kindergarten methods advocated by the State Board of Education, recognize the relations of mental culture to brain development. The Quincey methods are also based upon these principles.

# CONTENTS.

---

Members of the Board,	4
General Report,	5
Prominent forms of Disease,	7
Functions of Modern Boards of Health,	21
Secretary's Report,	27
Sanitary Publications,	30
Treatment of the Drowned,	21
Suggestions on Rural Hygiene,	34
Disinfection,	41
Domestic Poisons,	43
Treasurer's Report,	53
✓ ✓ Sewerage of Meriden,	58
✓ ✓ ✓ Sewerage of New Britain,	72
✓ ✓ ✓ Pollution of Streams,	77
State Prison,	79
Drainage of Fairfield,	85
Sickness from Impure Ice,	90
Sanitary and Unsanitary Conditions of the Soil,	95
School Hygiene,	111

---

The State Board of Health does not hold itself responsible for statements and opinions in any article unless such statements have been indorsed by a special vote.



State Board of Health.

---

BUREAU OF VITAL STATISTICS,

STATE OF CONNECTICUT.

---

REGISTRATION REPORT

FOR THE

*Year Ending December 31, 1878.*

NEW SERIES.—NO. 1.



Printed by Order of the Legislature.

---

HARTFORD, CONN.:

PRESS OF THE CASE, LOCKWOOD & BRAINARD COMPANY.

1879.



State Board of Health  
AND BUREAU OF VITAL STATISTICS.

---

DR. J. S. BUTLER, Hartford, PRESIDENT.

DR. C. A. LINDSLEY, New Haven.

PROF. WM. H. BREWER, New Haven.

A. E. BURR, Hartford.

DR. R. HUBBARD, Bridgeport.

A. C. LIPPITT, New London.

DR. C. W. CHAMBERLAIN, Hartford, SECRETARY,  
AND SUPERINTENDENT OF REGISTRATION OF VITAL STATISTICS.

# State of Connecticut.

---

OFFICE OF THE  
SUPERINTENDENT OF REGISTRATION OF VITAL STATISTICS,  
STATE HOUSE, Dec. 1, 1879.

*To his Excellency, CHARLES B. ANDREWS,*  
*Governor of the State of Connecticut:*

SIR: In conformity with the requirements of the laws of this State, I have the honor to submit the Annual Report relating to Births, Marriages, Deaths, and Divorces occurring in Connecticut in the year 1878, from the reports returned according to law from the several towns.

The compilations from the original returns, and the laborious mathematical work involved in the construction of the tables indicating the varying influences of age, sex, season, locality, and nationality, with the requisite protracted attention to details necessarily implied in such work, have been performed in this office by the Superintendent of Registration without recourse to expenditure for clerical aid.

The assistance of Dr. C. W. Page of Hartford, especially in the second series of tables, is gratefully acknowledged.

It is hoped that the facts contained in these returns have been presented and discussed in such a way as to render the lessons they convey plainly intelligible and practically useful.

Very respectfully,

C. W. CHAMBERLAIN, M.D.,  
*Secretary State Board of Health and*  
*Superintendent of Registration of Vital Statistics.*



## REGISTRATION REPORT, 1878.

---

The present is the first Report issued under the direction of the State Board of Health, to which is given the general supervision of the State system of registration of births, marriages, and deaths. The returns for the year were made to the Board, but direct supervision was exercised only during the last six months of the year. The subject of registration was very fully discussed by Dr. Lindsley in the Sanitary Report. By a modification in the law, prompt returns are now secured generally in the cities, and to considerable extent throughout the State. It is impossible to secure completeness and accuracy when the returns are made to the registrar only at the end of the year, as certified by the compilers of the ninth census and all statisticians. Even if the number be nearly complete, the cause of death, or other important facts, will be incorrectly stated, if at all. There is a field for constant effort for some time to come in improving the completeness and accuracy of the returns. The success already achieved affords encouragement for the future; the progress appears to be of a permanent and enduring nature, and the measures have the support of the intelligent and thoughtful. Of the importance to the State of complete public records in this department no argument is needed, as it is by this means alone that much that is essential to the successful management of public affairs can be learned. The protection of individual rights, the prevention of crime, and the interests of public order and morality, as well as the advancement of healthy living, and thereby prosperity as well as longevity, are thus secured. One of the most important sanitary laws thus derived is stated by Dr. Bowditch in two propositions:

1st. A residence on or near a damp soil, whether that dampness be inherent in the soil itself, or caused by percolation from adjacent ponds, rivers, meadows, marshes, or spongy soil, is one of the

principal causes of consumption in Massachusetts, probably in New England, and possibly in other portions of the globe.

2d. Consumption can be checked in its career, and possibly, nay, probably, prevented in some instances by attention to this law.

The application of this law to England and other lands has since been demonstrated. The control over the development of epidemic diseases like cholera and small pox, the powers of quarantine, and indeed not only does our knowledge of sanitary laws and all progressive gain rest upon a statistical basis, but also much of our progress in medical knowledge, if not all real gain in the power over disease.

In the present report the statistics of the year 1878 are presented, in relation to age, sex, and season, and, as far as may be, locality and nationality. As the results of the coming census will be available for our next report, many comparative statements can more profitably be then discussed. It is to be hoped that hereafter we may have a census once in five years, as the population, especially of the manufacturing centres, is so mutable that no system of estimates will give uniformly satisfactory results.

During the year 1878 there were 13,499 births, 4,285 marriages, 9,352 deaths, and 401 divorces. The number of registered births was less than in 1877 by 378. The number of registered marriages by 24. The number of registered deaths by 344. The number of divorces by 26.

The increase of births over deaths is 4,135, which is 241 less than in 1877, and somewhat less than the average for the last ten years. The sanitary history for the year, on the whole, does not give a favorable showing, and special causes will be analyzed later. One singular feature is the large number, comparatively, of sudden violent deaths. The tornado in Wallingford killed 30, the railroad accident at Tariffville 12, the steamboat explosion at Norwalk 12. These contribute to swell the totals from accident and violence.

The daily average of natural increase was 11.3.

Daily average of births, 19 m., 18 f., 37.

Daily average of marriages, 11.2.

Daily average of deaths, 25.6.

There were 221 colored births, five less than in 1877; 80 marriages, 16 less than in 1877; 240 deaths, one hundred *more* than in 1877, and 19 more than the births reported. The following table shows these statistics by counties:

## VITAL STATISTICS OF COLORED POPULATION.

COUNTIES.	BIRTHS.				MAR- RIAGES.	DEATHS.			
	M.	F.	N. S.	Total.		M.	F.	N. S.	Total.
Hartford,	23	19	4	46	18	25	30	2	57
New Haven,	32	38		70	30	37	42		79
New London,	10	12		22	13	15	15		30
Fairfield,	28	13	1	42	3	24	17	1	42
Windham,	5	6		11	6	4	3		7
Litchfield,	11	5		16	4	5	6		11
Middlesex,	4	5		9	3	1	9		10
Tolland,	1	4		5	2	3	1		4
Total,	114	102	5	221	80	114	123	3	240

There were 401 divorces granted in 1878, a less number than for many years. The following tables were reported by the State Librarian:

## DIVORCES, 1878.

	Husband's Petition.	Wife's Petition.		Total in 1877.
Hartford,	27	47	74	72
New Haven,	28	83	111	97
New London,	11	41	52	44
Fairfield,		51	74	92
Windham,	10	18	28	35
Litchfield,	7	16	23	36
Middlesex,	3	15	18	23
Tolland,	6	15	21	28
Total,	115	286	401	427



CAUSE.	Hartford Co.	New Haven Co.	New London Co.	Fairfield Co.	Windham Co.	Litchfield Co.	Middlesex Co.	Tolland Co.
Absence,	-	-	-	-	-	-	-	-
Adultery,	10	16	6	15	5	3	2	1
Infamous Crime,	-	-	-	-	-	-	-	-
Cruelty, - - -	15	20	14	16	-	3	6	8
Desertion, - - -	24	42	9	57	10	14	5	6
Fraudulent Contract,	-	-	-	1	-	1	-	-
Intemperance, - -	15	36	16	26	7	4	3	8
Misconduct, - -	10	36	7	-	6	2	6	1
Life Imprisonment,	-	-	-	-	-	-	-	-

The classification of causes is liable to the same imperfections as before, in that several causes are often assigned instead of one, and often of equal importance. The repeal of the so-called omnibus clause and other changes in the divorce laws, may have a tendency to decrease the number of divorces.

The nomenclature of diseases adopted in 1877 is followed with some slight variations, as it is the one most commonly in use at the present time, and renders comparative results more easily ascertainable, as well as secures the general advantages of uniformity. The tables will, it is hoped, aid in obtaining a better attention to details in the returns, as their relation to the facts required by the certificates is apparent, and also the value of these facts in giving a complete abstract of the vital history of the year and the manner each class and interest is affected by these annual changes and movements.

The greatest deficiency exists in the returns of occupations, and it is hoped that greater attention will be paid to this subject by registrars and those whose duty it is to make the returns. The relations of occupation to disease are extremely important as well as interesting; a brief analysis of the proportion returned will give some idea of the value of complete returns upon this subject.

## CAUSES OF DEATH.

## TABULAR LIST.

## CLASS I. ZYMOTIC DISEASES.

ORDER I.—*Miasmatic.*

- I. 1.—1. Smallpox, . . . . .
2. Measles, . . . . .
3. Scarlet Fever, . . . . .
4. Diphtheria, . . . . .
5. Quinsy, . . . . .
6. Croup, . . . . .
7. Whooping Cough, . . . . .
8. Typhoid (and Infantile) Fever, . . . . .
9. Erysipelas, . . . . .
10. Puerperal Fever (Metria), . . . . .
11. Carbuncle, . . . . .
12. Influenza, . . . . .
13. Dysentery, . . . . .
14. Diarrhœa, Cholera Morbus, . . . . .
15. Cholera Infantum, . . . . .
16. Cholera, . . . . .
17. Intermittent Fever, . . . . .
18. Remittent Fever, . . . . .
19. Typho-Malarial Fever, . . . . .
20. Rheumatism, . . . . .
21. Cerebro-spinal Meningitis, . . . . .

ORDER 2.—*Enthetic.*

- I. 2.—1. Syphilis, . . . . .
2. Stricture of Urethra, . . . . .
3. Hydrophobia, . . . . .
4. Glanders, . . . . .

ORDER 3.—*Dietic.*

- I. 3.—1. Privation, . . . . .
2. Purpura and Scurvy, . . . . .
3. Delirium tremens, } (Alcohol-
4. Intemperance, } (ism), . . . . .

ORDER 4.—*Parasitic.*

- I. 4.—1. Thrush, . . . . .
2. Worms, &c., . . . . .

## CLASS II. CONSTITUTIONAL DISEASES.

ORDER 1.—*Diathetic.*

- II. 1.—1. Gout, . . . . .
2. Dropsy and Anæmia, . . . . .
3. Cancer, . . . . .
4. Noma (or Canker), . . . . .
5. Mortification, . . . . .
6. Leucocythæmia, . . . . .

## SUPPLEMENTAL LIST

*Of Diseases of Special Character  
(or Synonyms).*

- I. 1.—1. Vaccination not stated.  
Smallpox (2d attack)  
After vaccination.  
Erysipelas, etc., after  
vaccination.  
Chickenpox.  
Miliaria.  
2. Rubcola.  
3. Angina maligna.  
5. Mumps.  
Tonsillitis.  
8. Typhus fever.  
9. Phlebitis.  
Pyæmia.  
Hospital gangrene.  
Erythema.  
10. Childbed fever.  
11. Anthrax.  
  
17. Malarial fever.  
18. Yellow fever.  
20. Rheumatism with peri-  
carditis, or disease of  
heart.  
21. "Spotted fever."
- I. 2.—1. Gonorrhœa.  
Purulent ophthalmia.  
4. Malignant pustule.  
Necus (usually from  
dissection wounds).
- I. 3.—1. Want of breast milk.  
2. Rickets.  
Bronchocle.
- I. 4.—3. Porrigo.  
Scabies.  
Tapeworm.  
Hydatids.  
Trichiniasis.
- II. 1.—3. Soft cancer.  
Sweep's cancer.  
Melanosis.  
Other kinds of cancer.  
Polypus (part not stated).  
Lupus.  
5. Bed-sore.  
Dry gangrene.

CAUSES OF DEATH.—*Continued.*

## TABULAR LIST.

ORDER 2.—*Tubercular.*

- II. 2.—1. Scrofula, .  
 2. Tabes Mesenterica, .  
 3. Phthisis (Consumption, Tubercular),  
 4. Hydrocephalus, . . .

## CLASS III. LOCAL DISEASES.

ORDER 1.—*Nervous System.*

- III. 1.—1. Cephalitis, . . .  
 2. Apoplexy, . . .  
 3. Paralysis, . . .  
 4. Insanity, . . .  
 5. Chorea, . . .  
 6. Epilepsy, . . .  
 7. Tetanus, . . .  
 8. Convulsions, . . .  
 9. *Brain Diseases*,\* . . .  
 10. Meningitis, &c., . . .

ORDER 2.—*Organs of Circulation.*

- III. 2.—1. Pericarditis,† . . .  
 2. Aneurism, . . .  
 3. *Heart Diseases*,† . . .  
 4. Valvular disease, &c., . . .  
 5. Embolism, . . .  
 6. Phlebitis, . . .

ORDER 3.—*Respiratory Organs.*

- III. 3.—1. Epistaxis, . . .  
 2. Laryngitis, . . .  
 3. Bronchitis, . . .  
 4. Pleurisy, . . .  
 5. Pneumonia, . . .  
 6. Asthma, . . .  
 7. *Lung Diseases*,† &c., . . .

ORDER 4.—*Digestive Organs.*

- III. 4.—1. Gastritis, . . .  
 2. Enteritis, . . .  
 3. Peritonitis, . . .  
 4. Ascites, . . .  
 5. Ulceration of Intestines, . . .  
 6. Hernia, . . .  
 7. Ileus, . . .  
 8. Intussusception, . . .  
 9. Stricture of Intestines, . . .  
 10. Fistula, . . .  
 11. *Stomach Diseases*,† &c., . . .  
 12. Colic, . . .

## SUPPLEMENTAL LIST.

- II. 2.—1. Psoas (lumbar) abscess.  
 Hip joint disease.  
 White swelling.  
 Cretinism.  
 2. Tubercular peritonitis.  
 3. Hæmoptysis.  
 4. Tubercular meningitis.

- III. 1.—1. Phrenitis. Myelitis.  
 4. Monomania.  
 Fright.  
 Grief.  
 Melancholia.  
 Rage.  
 6. Hysteria.  
 8. Laryngismus stridulus  
 9. Neuralgia.  
 Ophthalmia.  
 Otitis.  
 Dis. of spinal marrow.  
 Necrencephalus. (Softening of Brain.)

- III. 2.—1. Carditis.  
 Endocarditis.  
 3. Hypertrophia.  
 Angina Pectoris.  
 Syncope.  
 Arteritis.  
 Hydropericardium.

- III. 3.—2. Oedema glottidis.  
 4. Empyema.  
 Hydrothorax.  
 Diaphragmitis.  
 Pneumothorax.  
 5. Pulmonary apoplexy.  
 Pleuro pneumonia.  
 6. Grinders' asthma.  
 Miners' asthma.  
 Emphysema.

- III. 4.—1. Glossitis.  
 Stomatitis.  
 Pharyngitis.  
 Oesophagitis.  
 5. Perforation of—  
 6. Congenital.  
 Femoral.  
 Inguinal.  
 Scrotal.  
 Umbilical.  
 Ventral.  
 7. Constipation.  
 11. Dyspepsia.  
 Pyrosis.

\* Other diseases of the brain, or diseases of the nervous system, not otherwise distinguished, are referred to this head. *Mutatis mutandis*, the note applies to the corresponding heads in other Orders of this Class.

† [See also I. 1.—19.]

‡ See Note under III. 1.—9.

## CAUSES OF DEATH.—(Continued.)

TABULAR LIST.	SUPPLEMENTAL LIST.
CLASS III.—(Continued).	
12. <i>Pancreas Disease</i> ,† &c., . . .	Gastralgia.
13. <i>Hepatitis</i> , . . .	Hæmatemesis.
14. <i>Jaundice</i> , . . .	Melæna.
15. <i>Liver Disease</i> ,† &c., . . .	Hæmorrhoids.
16. <i>Spleen Disease</i> ,† &c., . . .	14. Gall-stones.
	15. Cirrhosis.
ORDER 5.— <i>Urinary Organs.</i>	
III. 5.—1. <i>Nephritis</i> , . . .	III. 5.—3. Albuminuria.
2. <i>Ischuria</i> , . . .	6. Cystirrheæa.
3. <i>Nephria</i> (Bright's disease), . . .	7. Diuresis.
4. <i>Diabetes</i> , . . .	Hæmaturia.
5. <i>Calculus</i> (Gravel, &c.), . . .	Dis. of prostate.
6. <i>Cystitis</i> , . . .	Dis. of bladder.
7. <i>Kidney Disease</i> ,† &c., . . .	
8. <i>Uræmia</i> , . . .	
ORDER 6.— <i>Generative Organs.</i>	
III. 6.—1. <i>Ovarian Dropsy</i> , . . .	III. 6.—1. Ovarian tumor.
2. <i>Disease of Uterus</i> ,† &c., . . .	2. <i>Hysteritis</i> (inflam'tion of womb). Metritis.
	Uterine tumor.
	Polypus uteri.
	Orchitis.
	Hydrocele.
ORDER 7.— <i>Organs of Locomotion.</i>	
III. 7.—1. <i>Arthritis</i> , . . .	III. 7.—1. Ostitis.
2. <i>Joint Disease</i> ,† &c., . . .	Periostitis.
	2. <i>Fragilitas ossium.</i>
	Mollities ossium.
	Caries.
	Necrosis.
	Exostosis.
ORDER 8.— <i>Integumentary System.</i>	
III. 8.—1. <i>Phlegmon</i> , . . .	III. 8.—1. Abscess (part not stated).
2. <i>Ulcer</i> , . . .	Boil.
3. <i>Skin Diseases</i> ,† &c., . . .	Whitlow.
	3. Roseola.
	Urticaria.
	Eczema.
	Herpes.
	Pemphigus.
	Ecthyma.
	Impetigo.
	Psoriasis.
	Ichthyosis.
	Tumor (part not stated).
CLASS IV. DEVELOPMENTAL DISEASES.	
ORDER 1.— <i>Developmental Diseases of Children.</i>	
IV. 1.—1. <i>Stillborn</i> , . . .	IV. 1.—2. Atelectasis.
2. <i>Premature Birth and Infantile Debility</i> , . . .	5. Anus imperforatus.
3. <i>Cyanosis</i> , . . .	Cleft palate.
4. <i>Spina Bifida</i> , . . .	Idiocy.
5. <i>Other Malformations</i> , . . .	
6. <i>Teething</i> , . . .	
7. <i>Trismus nascentium</i> , . . .	

† See Note under III. 1.—9.

CAUSES OF DEATH.—*Concluded.*

TABULAR LIST.	SUPPLEMENTAL LIST.
ORDER 2.— <i>Developmental Diseases of Women.</i>	
IV 2.—1. Paramenia, . . . . . 2. Childbirth. ( <i>See Metria I. 1.—9.</i> )	IV. 2.—1. Chlorosis. Climacteria. Menorrhagia. 2. Miscarriage. Abortion. Puerperal mania. Puerperal convulsions. Phlegmasia dolens. Cæsarian operation. Extra-uterine foetation. Flooding. Retention of placenta. Presentat'n of placenta. Deformed pelvis. Breast abscess.
ORDER 3.— <i>Developmental Diseases of Old People.</i>	
IV. 3.—1. Old Age, . . . . .	
ORDER 4.— <i>Diseases of Nutrition.</i>	
IV. 4.—1. Atrophy and Debility.	
CLASS V. VIOLENT DEATHS.	
ORDER 1.— <i>Accident or Negligence.</i>	
V 1.—1. Fractures and Contusions,   . . . . . 2. Wounds, . . . . . 3. Burns and Scalds, . . . . . 4. Poison, . . . . . 5. Drowning, . . . . . 6. Suffocation, . . . . . 7. Otherwise, . . . . .	V. 1.—1. Railroad accidents. 5. Lost at sea. 6. Asphyxia. Strangulation. 7. Exposure. Cold water. Frozen. Heat. Lightning. Surgical operation. Neglect.
ORDER 2.— <i>In Bottle.</i>	
ORDER 3.— <i>Homicide.</i>	
ORDER 4.— <i>Suicide.</i>	
V 4.—1. Wounds, . . . . . 2. Poison, . . . . . 3. Drowning, . . . . . 4. Hanging, . . . . . 5. Otherwise, . . . . .	
ORDER 5.— <i>Execution.</i>	
V. 5.—1. Hanging, . . . . .	
V. 6.—Violent Deaths, not classed (“casualty”), . . . . . Sudden, cause unascertained, . . . . .	

NOTE.—Cases of “infantile fever” are classed with relapsing fever, under one name, “typhoid fever.” Cases of “rheumatic fever” are classed with “rheumatism;” of “hemorrhage,” and “abscess,” with the diseases of the organs affected. Cases of death from cold, heat, drinking cold water, lightning, surgical operation, and exposure, are placed under “Otherwise” [V. 7]. As “stricture of the urethra” is almost invariably the result of gonorrhœa, it is classed as I. 2.—2 Gastric fever is classed under Gastritis.

**T A B L E 1.**  
**BIRTHS, MARRIAGES, AND DEATHS IN THE SEVERAL TOWNS, FOR THE YEAR ENDING DECEMBER 30, 1878.**  
**HARTFORD COUNTY.**

TOWNS.	Population in 1870.	BIRTHS.				MARRIAGES.								DEATHS.										
		SEX.		PARENTAGE.		Total.	American.	Foreign.	For. Husband.	Am. Wife.	Both Foreign.	For. Wife, Amer.	Amer. Wife, For.	Unknown.	Total.	Both non-resident.	Ills. non-resident.	SEX.		NATIVITY.				
		Male.	Female.	Unknown.	Female.													Male.						
																			Unknown.		For. Husband.	Am. Wife.	Unknown.	Female.
HARTFORD.....	37,743	496	390..	886	339	395	53	64	35	23	76	23	41	8	366	13	32	385	367	4	756	545	181	30
Avon.....	987	10	7..	17	12	3	1	1..	1..	...	1..	...	2..	2..	3..	1	6	8..	8..	14	12	2..	..	..
Berlin.....	2,346	40	27..	67	31	34	...	2..	...	1..	12..	...	...	...	13	1..	18	9..	9..	27	26	1..	..	..
Bloomfield.....	1,437	12	12..	24	18	3	2	1..	5..	...	5..	...	...	...	6..	...	7	9..	16	8	2	6	..	..
Bristol.....	3,788	56	49	107	66	26	4	10	1	38	2	...	5..	...	45	1	4	33	31..	64	54	10..	..	..
Burlington.....	1,319	17	20..	37	12	16	1	3	5	2..	2..	...	...	...	2..	...	14	7..	21	17	4..	..	..	..
Canton.....	2,639	24	43..	67	31	36	...	...	...	15	12	...	...	...	27	1	19	14..	14..	33	27	6..	..	..
East Granby.....	853	10	6..	16	15	1..	...	...	...	4..	4..	...	...	...	4	1..	7	9..	16	13	3..	..	..	..
East Hartford.....	3,007	56	32..	88	47	28	5	5	3	17	3	4	...	...	28	1	5	28	27..	55	45	7	3	..
East Windsor...	2,882	26	24..	50	18	27	2	3..	16..	...	16..	...	4..	...	20	...	15	14..	29	24	5..	..	..	..
Enfield.....	6,322	80	66	147	50	79	3	15..	42	8	4	8..	...	...	62	15	43	82	126	92	34..	..	..	..
Farmington.....	2,616	20	20..	40	22	12	3	3..	10..	1..	10..	...	...	...	11	...	20	26..	46	36	7	3	..	..
Glastonbury.....	3,560	42	26	69	53	13	2	1..	22	1..	22	...	...	...	23	1	21	23..	44	31	3	5	..	..
Granby.....	1,517	13	7..	20	18	2..	...	...	9..	...	9..	...	1..	...	10	...	15	17..	32	36	1..	..	..	..
Hartland.....	789	4	5	10	8	2..	...	...	2..	...	2..	...	...	...	2..	...	3	3..	6	7..	...	..	..	..
Manchester.....	4,223	65	54..	119	47	60	5	7..	14	9	5	4..	...	...	32	...	38	27..	65	46	18..	..	..	..
Marlborough.....	476	5	1..	6	6	...	...	...	...	...	...	...	...	...	1..	...	3	4..	7	4	1..	..	..	..
New Britain.....	9,480	215	182	5	402	183	177	14	28..	48	21	7	17	4	97	1	6	97	96	2	195	116	38	53
Newington.....	778	4	12	16	7	8	1..	...	4	1..	...	...	...	...	5..	...	8	9	1	18	16	2..	..	..
Plainville.....	1,433	14	13..	27	18	7..	...	2..	11	1	1	1	...	...	14	...	7	7..	14	11	3..	..	..	..
Rocky Hill.....	971	12	7..	19	13	4	1	1	...	...	...	...	...	...	4	...	3	10..	13	10	9	1	..	..
Stonbury.....	2,051	24	13..	37	26	11..	...	...	11	1..	...	...	...	...	12	...	28	22..	50	40	10..	..	..	..
Southington.....	4,314	69	50	3	122	62	35	7	18..	25..	5	5..	...	...	35	...	48	34	82	70	12..	..	..	..
South Windsor...	1,688	28	23..	51	29	17	5..	...	17..	...	17..	...	...	...	18	...	9	12	2	23	21	2..	..	..
Suffield.....	3,277	30	29..	59	31	25	2	1..	17..	...	17..	...	2	1	22	2	5	20	12..	32	23	9..	..	..
West Hartford.....	1,533	6	7..	13	10	2..	...	...	1	8	1	...	...	...	9	...	8	17..	25	21	3	1	..	..
Wethersfield.....	1,915	20	17..	37	23	9	1	4..	11..	...	11..	...	...	...	11	...	17	18..	35	33	2..	..	..	..
Windsor.....	2,783	27	27..	54	25	21	2	6..	8	2	...	...	...	...	11	...	10	6..	26	23	3..	..	..	..
Windsor Locks...	2,154	25	23..	48	24	15	1	8..	12	10	1	3..	...	...	26	3	1	13	17..	30	18	12..	..	..
Totals.....	109,007	1,450	1,192	14	2,656	1,247	1,066	115	184	44	608	148	55	160	8	919	40	950	940	10	1,900	1,425	379	96



## REPORT OF THE STATE BOARD OF HEALTH.

## NEW HAVEN COUNTY.

TOWNS.	BIRTHS.						MARRIAGES.						DEATHS.									
	SEX.			PARENTAGE.			SEX.						NATIVITY.									
	Male.	Female.	Unknown.	Total.	American.	Foreign.	For Husband.	Am. Wife.	Unknwn.	Both American.	Both Foreign.	For Wife, Amer.	Amer. Wife, For.	Unknwn.	Total.	Male.	Female.	Unknown.	American.	Foreign.	Unknown.	
New Haven.....	968	937	1,905	628	1,045	80	152	..	282	124	34	66	..	506	733	585	568	1,153	887	266	..	
Beacon Falls*.....	7	5	12	3	6	2	1	..	1	1	..	..	..	2	1	..	6	..	6	..	..	
Bethany.....	7	5	12	11	1	..	..	..	2	..	..	..	..	2	..	4	1	5	..	..	..	
Branford.....	32	28	60	33	17	1	6	..	14	1	2	5	..	22	..	22	27	49	44	3	2	
Cheshire.....	2,488	2,344	4,832	45	27	16	1	1	..	..	2	1	..	13	1	15	20	35	29	6	..	
Derby.....	8,020	159	8,179	285	88	145	17	31	46	17	3	5	..	71	46	78	100	178	146	27	5	
East Haven.....	2,714	24	2,738	43	29	12	..	..	13	..	1	..	..	14	12	18	11	29	23	4	2	
Guilford.....	2,476	26	2,502	49	38	8	2	1	13	..	1	..	..	14	2	18	20	38	37	..	1	
Hamden.....	3,028	15	3,043	35	15	13	3	4	10	..	..	2	..	12	..	24	20	45	30	8	1	
Madison.....	1,814	9	1,823	17	12	4	..	1	10	..	..	..	..	10	..	12	14	26	25	1	..	
Meriden.....	10,495	254	10,749	460	176	217	24	39	66	32	7	22	..	127	17	189	178	367	280	87	..	
Middlebury.....	696	3	700	6	5	1	..	..	6	..	..	..	..	6	..	6	6	12	11	1	..	
Milford.....	3,405	28	3,433	49	42	5	..	2	15	2	1	..	..	18	1	31	38	69	60	5	4	
Naugatuck.....	2,830	56	2,886	121	41	40	7	330	12	9	6	4	..	31	..	30	29	59	45	14	..	
North Branford... ..	1,035	5	1,040	12	11	1	..	..	5	..	..	..	..	6	..	6	4	10	9	1	..	
North Haven.....	1,771	14	1,785	29	18	9	..	..	6	..	..	1	..	7	..	7	14	21	20	1	..	
Orange.....	2,634	19	2,653	59	30	20	2	6	9	..	1	..	..	10	..	19	25	44	38	6	..	
Oxford.....	1,338	9	1,347	22	19	3	..	..	5	..	..	..	..	5	..	10	8	18	16	2	..	
Prospect.....	551	2	553	4	4	..	..	..	2	..	..	..	..	2	..	5	2	7	6	1	..	
Seymour.....	2,122	37	2,159	58	29	22	2	5	13	1	1	5	..	20	..	19	18	37	32	5	..	
Southbury.....	1,318	14	1,332	26	20	4	1	1	10	..	..	..	..	10	..	12	5	17	17	..	..	
Wallingford.....	3,676	68	3,744	121	53	48	4	11	18	6	1	6	..	31	..	46	38	85	68	16	1	
Waterbury.....	13,106	224	13,330	450	140	276	20	23	92	34	14	28	..	168	..	121	113	234	152	82	..	
Wolcott.....	491	2	493	5	4	1	..	..	3	..	..	..	..	..	..	3	2	5	5	..	..	
Woodbridge.....	830	11	841	15	13	2	..	..	3	..	..	..	..	3	..	2	11	13	11	2	..	
Totals.....	121,257	2,020	123,277	63,900	1,489	1,916	166	288	41	663	227	73	147	..	1,110	69,511	1,284	1,276	2,562	2,002	538	22

\* Made a town in 1871, from Bethany, Naugatuck, Oxford, and Seymour.

\* Made a town in 1871, from Bethany, Naugatuck, Oxford, and Seymour.

## NEW LONDON COUNTY.

TOWNS.	Population in 1870.	BIRTHS.					MARRIAGES.						DEATHS.										
		SEX.		PARENTAGE.			Both American.	For. Wife, Amer.	Amer. Wife, For.	Unknown.	Total.	Both non-resident.	Hus. non-resident.	SEX.		NATIVITY.							
		Male.	Female.	Total.	American.	Foreign.								For. Husband.	Am. Wife.	Am. Husband.	Unknown.	Male.	Female.	Unknown.	Total.	American.	Foreign.
NEW LONDON.....	9,576	132	121	4	257	163	86	5	5	50	10	7	9	76	5	92	100	179	32	..			
NORWICH.....	16,653	247	222	8	472	177	280	15	..	94	31	13	23	161	1	265	230	389	108	..			
Bozrah.....	984	8	4	..	12	2	9	1	..	5	..	1	1	7	..	2	4	4	2	..			
Colchester.....	3,383	21	29	..	50	21	22	2	5	17	6	4	6	33	1	34	30	48	7	9			
East Lyme.....	1,506	21	21	1	43	31	11	..	1	9	..	..	..	9	2	15	16	31	19	..			
Franklin.....	731	2	2	..	4	4	..	..	..	4	..	..	..	4	..	7	2	9	9	..			
Griswold.....	2,575	22	27	7	56	28	23	4	1	15	10	3	1	29	5	18	11	29	25	4	..		
Groton.....	5,124	33	50	2	85	75	9	..	1	39	1	4	..	44	7	38	23	61	58	3	..		
Lebanon.....	2,211	14	11	..	25	21	3	..	1	10	1	..	..	11	..	8	13	21	21	..	..		
Ledyard.....	1,392	13	11	..	24	..	..	..	24	4	..	..	..	4	..	9	16	25	25	..	..		
Lisbon.....	502	11	6	..	17	7	9	1	..	1	..	1	..	1	..	6	8	14	12	2	..		
Lyme.....	1,181	11	13	..	24	23	..	..	1	12	..	..	..	12	1	11	6	17	16	..	1		
Montville.....	2,495	25	19	..	44	29	11	1	3	12	..	..	..	12	2	5	10	15	14	1	..		
North Stonington.	1,759	25	13	..	38	30	4	3	1	3	..	..	..	3	..	26	22	48	47	1	..		
Old Lyme.....	1,362	15	19	1	35	28	6	1	..	10	..	..	..	10	1	8	5	13	13	..	..		
Preston.....	2,161	14	10	..	24	21	2	..	1	4	1	1	1	7	1	19	21	40	..	40	..		
Salem.....	717	3	4	..	7	4	3	..	..	4	..	..	..	4	..	4	3	7	7	..	..		
Sprague.....	3,463	56	40	..	96	6	90	..	..	5	21	4	..	30	..	29	22	51	33	18	..		
Stonington.....	6,313	74	59	..	133	71	51	5	6	21	8	2	7	38	5	42	47	89	57	15	17		
Waterford.....	2,482	27	18	3	48	38	9	..	1	18	..	..	1	19	2	9	13	22	22	..	..		
Total.....	66,570	774	699	21	1,494	777	628	38	27	337	89	39	49	514	930	647	602	1,270	998	193	77		

## FAIRFIELD COUNTY.

TOWNS	BIRTHS.				MARRIAGES								DEATHS.												
	SEX.			Total.	PARENTAGE				Both American.	For. Wife, Amer.	Amer. Wife, For.	Unknown.	SEX.			NATIVITY.									
	Male.	Female.			American.	Foreign.	For. Husband.	Am. Husband.					Unknown.	Male.	Female.			Unknown.	Total.						
Population in 1870.																									
DANBURY.....	8,753	128	88	2	218	121	81	4	9	3	54	8	4	4	7	77	1	5	72	57	2	131	76	10	45
Bridgeport.....	19,835	460	426	8	894	282	289	30	70	223	121	45	13	23	32	234	13	208	185	6	399	290	49	60	
Bethel.....	2,311	30	19	..	49	36	9	1	3	..	9	..	..	..	..	9	1	16	23	..	39	33	5	1	
Brookfield.....	1,193	15	6	..	21	12	8	1	..	..	1	..	..	..	..	1	..	7	7	..	14	14	..	..	
Darien.....	1,808	13	21	1	35	27	7	..	1	..	9	..	..	..	..	9	2	14	11	..	25	25	..	..	
Easton.....	1,288	10	6	..	16	12	4	..	..	..	3	..	..	..	..	3	..	4	8	..	12	12	..	..	
Fairfield.....	5,645	28	23	..	51	27	15	4	5	..	19	4	..	..	4	27	1	13	28	..	41	37	4	..	
Greenwich.....	7,644	50	39	..	89	56	23	5	5	..	17	..	5	4	..	26	4	42	34	..	76	67	9	..	
Huntington.....	1,527	23	22	..	45	32	8	1	4	..	8	1	..	..	..	9	..	15	16	..	31	28	2	1	
Monroe.....	1,226	5	1	..	6	6	..	..	..	..	13	..	..	..	..	13	..	3	3	..	6	6	..	..	
New Canaan.....	2,497	23	16	1	40	27	8	..	5	..	11	..	..	1	..	12	2	17	18	..	35	32	2	1	
New Fairfield.....	870	9	4	..	13	12	1	..	..	..	..	..	..	..	..	..	..	6	5	1	12	12	..	..	
Newtown.....	3,681	35	18	..	53	24	27	2	..	..	14	8	1	3	..	26	..	21	18	..	39	32	7	..	
Norwalk.....	12,119	155	134	1	290	186	172	11	19	2	43	5	9	7	..	64	1	121	95	1	217	183	28	6	
Reading.....	1,624	10	15	..	25	17	8	..	..	..	4	..	..	..	..	4	..	8	9	..	17	16	1	..	
Ridgefield.....	1,919	12	11	..	23	22	..	..	1	..	9	1	..	..	1	11	..	17	14	1	32	30	1	1	
Sherman.....	846	10	10	..	20	19	1	..	..	..	3	..	..	..	..	3	..	9	5	..	14	13	1	..	
Stamford.....	9,714	154	135	1	290	71	188	9	18	4	47	13	3	7	..	70	1	99	80	1	180	146	36	8	
Stratford.....	3,032	9	8	..	18	13	4	1	..	..	24	1	-1	1	..	27	1	10	13	..	23	22	1	..	
Trumbull.....	1,335	11	8	..	19	17	2	..	..	..	5	..	..	2	..	7	..	8	12	..	20	20	..	..	
Weston.....	1,054	7	7	..	14	10	4	..	..	..	8	..	..	..	..	8	1	4	7	..	11	10	1	..	
Westport.....	3,361	27	31	3	61	41	13	3	4	..	19	2	2	..	..	23	..	30	20	1	51	45	6	..	
Wilton.....	1,994	15	15	..	30	23	1	2	4	..	10	..	..	2	..	12	..	12	19	..	31	9	1	21	
Totals	95,276	1,239	1,064	17	2,320	993	873	74	148	232	451	88	38	55	43	675	9	756	637	13	1,456	1,148	164	144	

## WINDHAM COUNTY

TOWNS.	BIRTHS.				MARRIAGES.								DEATHS.							
	SEX.				PARENTAGE.				SEX.				NATIVITY.							
	Male.	Female.	Unknown.	TOTAL.	American.	Foreign.	For. Husband.	Am. Husband.	Both American.	Both Foreign.	For. Wife, Amer.	Amer. Wife, For.	Unknown.	TOTAL.	Male.	Female.	Unknown.	Total.	American.	Foreign.
Population in 1870.																				
BROOKLYN.....	21	19	40	15	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	16	15	.....	31	26	5
Asford.....	2	6	8	8	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	5	.....	15	12	1
Canterbury.....	7	12	19	15	2	1	1	1	.....	.....	.....	.....	.....	.....	8	10	.....	18	17	1
Chaplin.....	4	7	11	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	3	.....	6	6	.....
Eastford.....	6	4	10	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12	11	.....	23	22	1
Hampton.....	5	10	15	13	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	9	.....	15	14	1
Killingly.....	102	87	189	93	81	8	7	.....	.....	.....	.....	.....	.....	.....	69	37	.....	106	89	17
Plainfield.....	31	43	74	33	35	6	.....	.....	.....	.....	.....	.....	.....	.....	23	15	.....	38	38	.....
Pomfret.....	21	22	43	29	8	2	4	.....	.....	.....	.....	.....	.....	.....	19	9	.....	28	28	.....
Putnam.....	100	112	216	53	145	18	.....	.....	.....	.....	.....	.....	.....	.....	55	63	.....	121	83	38
Scotland.....	2	2	4	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	6	.....	9	9	.....
Sterling.....	11	10	21	10	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	3	.....	7	7	.....
Thompson.....	67	71	138	22	108	4	4	.....	.....	.....	.....	.....	.....	.....	51	38	.....	90	74	16
Voluntown.....	25	14	39	28	11	.....	.....	.....	.....	.....	.....	.....	.....	.....	11	11	.....	22	20	2
Windham.....	97	89	187	71	88	13	15	.....	.....	.....	.....	.....	.....	.....	58	66	.....	126	100	15
Woodstock.....	20	12	32	30	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	13	19	.....	32	27	2
Totals.....	521	520	5,046	442	518	46	40	.....	.....	.....	.....	.....	.....	.....	363	318	.....	687	571	99
	38,518							221	86	18	15	.....	.....	.....						



## MIDDLESEX COUNTY.

TOWNS.	BIRTHS.					MARRIAGES.							DEATHS.													
	SEX.			PARENTAGE.				Both American.	Both Foreign.	For. Wife, Amer.	Amer. Wife, For.	Unknown.	Total.	Both non-resident.	Has. non-resident.	SEX.			NATIVITY.							
	Male.	Female.	Unknown.	Total.	American.	Foreign.	For. Husband.									Am. Husband.	For. Wife.	Unknown.	Male.	Female.	Unknown.	Total.	American.	Foreign.	Unknown.	Total.
Population in 1870.	104	103	1	208	116	68	13	21	6	6	11	7	72	27	3	91	115	206	156	45	5					
MIDDLETOWN. . .	2,071	24	12	36	26	4	6	10	3	1	14	1	12	14	26	26	26	26	26	26	26					
HADDAM. . . . .	2,771	23	22	45	32	12	1	7	3	1	7	7	7	3	15	28	28	28	28	28	28					
Chatham. . . . .	1,094	14	10	24	21	1	1	3	3	1	7	7	3	3	8	21	17	4	3	3	3					
Chester. . . . .	1,404	9	16	22	21	1	1	10	1	2	10	10	10	1	14	24	21	24	21	21	21					
Clinton. . . . .	1,856	14	18	33	9	18	2	4	1	1	4	4	5	1	5	25	13	30	21	9	3					
Cromwell. . . . .	1,086	9	6	15	10	3	2	22	1	2	14	14	5	5	10	15	10	15	10	10	10					
Durham. . . . .	2,951	27	20	47	42	5	5	14	1	2	25	1	22	1	18	46	44	46	44	44	44					
East Haddam. . .	1,669	11	15	26	22	4	4	5	5	5	14	14	5	5	15	15	15	15	15	15	15					
Essex. . . . .	856	1	5	6	5	1	1	2	2	2	5	5	5	5	9	9	9	9	9	9	9					
Killingworth. . .	1,053	3	8	11	5	4	1	1	1	1	2	2	2	2	7	9	9	9	9	9	9					
Middlefield. . . .	1,215	14	11	25	16	8	1	8	1	1	9	9	8	1	11	18	17	18	17	17	17					
Old Saybrook. . .	4,693	51	40	91	30	58	2	6	15	4	27	3	6	15	39	66	46	66	46	46	46					
Portland. . . . .	1,267	10	12	22	16	3	2	4	1	1	4	4	4	1	8	20	20	20	20	20	20					
Saybrook. . . . .	987	5	7	12	12	1	1	7	1	1	8	8	7	1	9	22	22	22	22	22	22					
Westbrook. . . . .	36,099	316	305	623	362	189	23	35	24	13	14	17	176	49	13	259	296	555	460	87	8					
Totals. . . . .																										

87 8



## TOLLAND COUNTY.

TOWNS.	Population in 1870.	BIRTHS.				MARRIAGES.							DEATHS.							
		SEX.		PARENTAGE.		Both American.	Both Foreign.	For. Wife, Amer.	Amer. Husband.	Unknwn.	Total.	Both non-resident.	Hus. non-resident.	SEX.		NATIVITY.				
		Male.	Female.	Unknown.	Total.									Male.	Female.	Unknwn.	Total.	American.	Foreign.	Unknown.
TOLLAND.....	1,216	13	10	23	18	5	.....	.....	.....	.....	11	1	1	1	14	9	23	17	3	3
Andover.....	461	4	2	6	5	1	.....	.....	.....	.....	2	.....	.....	.....	3	4	7	6	1	.....
Bolton.....	576	5	5	10	7	3	.....	.....	.....	.....	6	.....	.....	.....	6	4	10	9	1	.....
Columbia.....	891	5	6	11	8	3	.....	.....	.....	.....	.....	.....	.....	.....	11	6	17	14	3	.....
Coventry.....	2,057	24	16	40	25	12	1	.....	.....	.....	15	4	.....	.....	13	6	25	16	7	2
Ellington.....	1,452	5	12	17	11	5	.....	.....	.....	.....	8	.....	.....	.....	4	9	13	10	3	.....
Hebron.....	1,279	9	9	18	12	2	1	.....	.....	.....	6	.....	.....	.....	6	6	12	12	.....	.....
Mansfield.....	2,401	18	19	38	31	6	.....	.....	.....	.....	15	.....	.....	.....	12	9	22	20	2	.....
Somers.....	1,247	9	11	21	16	5	.....	.....	.....	.....	7	.....	.....	.....	8	6	14	14	.....	.....
Stafford.....	3,405	38	37	75	39	26	2	.....	.....	.....	22	1	.....	.....	22	19	42	30	8	4
Union.....	627	3	8	11	8	2	1	.....	.....	.....	5	.....	.....	.....	2	4	6	6	.....	.....
Vernon.....	5,446	88	96	184	57	106	7	.....	.....	.....	21	13	5	.....	57	48	105	79	26	.....
Willington.....	942	11	14	25	16	5	2	.....	.....	.....	2	.....	.....	.....	12	9	21	19	2	.....
Totals.....	22,000	232	245	479	253	181	14	30	127	19	7	19	12	184	170	145	317	252	56	9

## RECAPITULATION BY COUNTIES.

COUNTIES.	Population in 1870.	BIRTHS.					MARRIAGES.							DEATHS.												
		SEX.			PARENTAGE.		Both American.	Both Foreign.	For. Wife, Amer.	Amer. Wife, For.	Unknown.	Total.	Both non-resident.	Hus. non-resident.	SEX.			NATIVITY.								
		Male.	Female.	Unknown.	Total.	American.									Foreign.	For. Husband.	Am. Wife.	Am. Husband.	Foreign.	Total.	Male.	Female.	Unknown.	American.	Foreign.	Unknown.
Hartford.....	109,007	1,450	1,192	14	2,656	1,247	1,066	115	184	44	608	148	55	100	8	919	40	80	950	940	101,900	1,425	379	96	Unknown.	
New Haven...	121,257	2,020	1,874	6	3,900	1,489	1,916	166	288	41	663	227	73	147	..	1,110	69	51	1,284	1,276	2,562	2,002	538	22	Foreign.	
New London.	66,570	774	699	21	1,494	777	628	38	27	24	337	89	39	49	..	514	9	30	647	602	21,270	1,000	191	79	American.	
Fairfield.....	95,276	1,239	1,064	17	2,320	993	873	74	148	232	451	88	38	55	43	675	9	58	755	687	13,456	1,148	164	144	Foreign.	
Windham....	38,518	521	520	5	1,046	443	518	46	39	...	221	86	18	15	..	340	14	40	363	318	6	687	571	99	17	Unknown.
Litchfield.....	48,727	521	456	4	981	586	333	22	40	...	272	15	13	19	2	321	10	30	302	296	7	605	496	75	34	Foreign.
Middlesex.....	36,099	316	305	2	623	362	189	23	35	24	176	49	13	14	..	252	1	17	259	296	..	555	460	87	8	Unknown.
Tolland.....	22,000	232	245	2	479	253	181	14	30	1	127	19	7	19	12	184	8	20	170	145	2	317	252	56	9	Foreign.
Totals.....	537,454	7,073	6,355	71	13,499	6,150	5,704	498	791	356	2,855	721	256	418	65	4,315	160	326	4,731	4,560	61	9,352	7,354	1,589	409	Unknown.

## TABLE

EXHIBITING THE NUMBER OF BIRTHS IN THE SEVERAL COUNTIES  
FOR EACH MONTH OF THE YEAR ENDING DECEMBER 31, 1878.

COUNTY.	SEX.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Hartford ....	Males.....	131	115	144	102	123	115	123	137	127	121	103	109	1,450
	Females...	110	84	99	79	102	107	108	104	111	95	94	99	1,192
	Not stated.	1	.....	.....	1	2	.....	1	.....	3	.....	4	2	14
New Haven..	Males.....	165	168	165	171	165	160	169	173	167	176	173	168	2,020
	Females...	159	137	154	139	163	146	171	166	159	165	160	155	1,874
	Not stated.	.....	1	.....	.....	1	.....	.....	.....	.....	1	.....	3	6
New London.	Males.....	68	65	68	58	68	62	64	61	76	64	64	59	777
	Females...	67	67	45	46	50	71	66	53	62	53	55	64	699
	Not stated.	4	3	.....	.....	1	.....	5	1	1	.....	.....	3	18
Fairfield.....	Males.....	120	81	114	103	91	86	103	108	120	97	99	117	1,239
	Females...	103	72	91	89	106	67	79	97	103	92	86	79	1,064
	Not stated.	.....	.....	2	5	1	1	2	2	2	.....	2	.....	17
Windham....	Males.....	53	37	48	51	40	36	48	46	47	37	34	44	521
	Females...	38	44	41	36	36	37	51	57	36	44	51	49	520
	Not stated.	.....	.....	.....	.....	1	.....	4	.....	.....	.....	.....	.....	5
Litchfield....	Males.....	41	41	45	55	52	38	39	56	36	52	40	26	521
	Females...	56	25	43	31	39	35	44	49	38	29	30	37	456
	Not stated.	1	.....	.....	.....	.....	1	.....	1	.....	.....	.....	1	4
Middlesex...	Males.....	38	22	22	24	22	22	24	30	28	22	34	28	316
	Females...	19	23	21	35	24	26	33	32	22	23	10	37	305
	Not stated.	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	2
Tolland.....	Males.....	20	13	22	25	13	22	19	16	24	21	19	18	232
	Females...	21	27	13	26	25	20	5	31	15	23	20	19	245
	Not stated.	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	2
Total....	Males.....	636	542	628	589	574	541	589	627	625	590	566	569	7,076
	Females...	573	479	507	481	545	509	557	589	546	524	506	539	6,355
	Not stated.	6	4	3	6	6	3	12	4	6	1	6	11	68
Grand Total.....		1215	1025	1138	1076	1125	1053	1158	1220	1177	1115	1078	1119	13,499

TABLE 2.

[illegible]

## CLASS II.—CONSTITUTIONAL DISEASES.

CLASS III.—LOCAL DISEASES.

[illegible]

## CLASS III.—LOCAL DISEASES—Concluded.

TOWNS IN HARTFORD CO.	ORDER 4.—DIGESTIVE ORGANS.										ORDER 5.—URINARY ORGANS, GENERATIVE ORGANS.										ORDER 6.—ORGANS OF LOCOMOTION.				ORDER 7.—INTERMEDIARY SYSTEM.				TOTAL FOR CLASS III.								
	Gastritis.	Enteritis.	Peritonitis.	Ulceration of Intestines.	Hernia.	Intussusception.	Fistula.	Stomach Disease.	Hepatitis.	Jaundice.	Liver Disease.	Spleen Disease.	Total.		Nephritis.	Bright's Disease.	Gravel.	Cystitis.	Kidney Disease.	Uremia.	Prostatitis.	Total.		Ovarian Dropsy.	Disease of Uterus.	Joint Diseases.	Cancer.	Necrosis.	Total.		Pleurisy.	Ulcer.	Skin Diseases.	Total.			
													M.	F.								M.	F.						M.	F.				M.	F.		
HARTFORD....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	130	106	236
Avon.....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	5
Berlin.....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Bloomfield....	2	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Bristol.....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Burlington....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Canton.....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
East Granby....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
East Hartford..	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
East Windsor..	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Enfield.....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Farmington....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Glastonbury....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Granby.....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Hartland.....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Manchester....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Marlborough....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
New Britain....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Newington....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Plainville....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Rocky Hill....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Simsbury....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Southington....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
South Windsor..	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Suffield.....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
West Hartford..	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Wethersfield...	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Windsor.....	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Windsor Locks..	1	2	2	2	2	1	1	1	1	5	5	11	12	14	13	2	2	5	5	1	1	6	14	6	1	1	1	1	1	1	1	1	1	1	1	4	4
Totals.....	4	2	7	2	4	2	14	2	14	2	14	2	20	31	25	8	1	5	15	1	1	38	16	3	1	4	2	2	1	1	7	5	4	292	261	553	



## CLASS IV.—DEVELOPMENTAL DISEASES.

## CLASS V.—VIOLENT DEATHS.

CLASS IV.—DEVELOPMENTAL DISEASES.										CLASS V.—VIOLENT DEATHS.										GRAND TOTAL FOR ALL CLASSES.																								
ORDER 1.—OF CHILDREN. OF WOMEN.					ORDER 2.—OF OLD PEOPLE.					ORDER 3.—ATROPHY AND NUTRITION.					ORDER 4.—ACCIDENT OR NEGLECT.					ORDER 5.—SUDDEN DEATHS.					TOTAL FOR CLASS V.																			
Stillborn.	Premature Birth.	Gynaecosis.	Spina Bifida.	Malformation.	Teething.	Total.		Childbirth.		Total.		Old Age.		Atrophy and Debility.		Males.		Females.		Total.		Order 1—Suicide.		Order 2—Homicide.		Order 3—Total.		Sudden.		Sudden Cause, unascertained.		Males.	Females.	Total.										
						M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.				M.	F.	M.	F.						
HARTFORD....	16	11				16	11	11	11							40	61	101				3	1	8								40	28	63	34	97	389	367	756					
Avon.....																																					6	8	14					
Berlin.....	2					1	1									2	1	3				1		1											1	1	2	19	8	27				
Bloomfield.....																																					2	7	9	16				
Bristol.....																																					3	3	31	64				
Burlington.....																																					14	7	21					
Canton.....	3					3	2									3	2	5				2														10	13	33						
East Granby.....																																					7	9	16					
East Hartford.....																																					28	27	55					
East Windsor.....	2	2																																			1	2	3					
Enfield.....	3					3	1																													6	32	47	79	126				
Farmington.....																																					1	2	3	5	10	21	25	46
Glastonbury.....																																					2	2	3	2	5	21	23	44
Granby.....																																					2	2	4	15	17	32		
Hardland.....																																					3	3	6					
Manchester.....																																					2	4	5	9	38	27	65	
Marlborough.....																																					1	1	2	3	2	5	7	
New Britain.....	2	4				5	2																													31	28	34	29	63	100	95	195	
Newington.....	1					1																															2	10	8	18	18	18	18	
Plainville.....																																					1	7	7	14	14	14	14	
Rocky Hill.....																																					1	1	2	11	13	27	23	50
Simsbury.....																																					1	8	16	27	23	50		
Southington.....	3					1	2																													2	1	2	3	46	36	82		
South Windsor.....	2					2																															1	2	3	9	14	23		
Suffield.....	1					1																															1	2	3	19	13	32		
West Hartford.....																																					2	5	7	10	15	25		
Wethersfield.....	1					1																															1	1	3	3	5	17	18	35
Windsor.....																																					1	1	2	4	11	15	26	
Windsor Locks.....	1					1																															1	1	2	12	18	30		
Totals.....	31	24	2	3	37	23	23	23	23	44	64	16	20	97	103	227	4	7	6	14	14	13	31	50	28	1	4	4	5	2	102	4	157	148	305	954	946	1,900						

## CLASS I.—ZYMOTIC DISEASES.

TOWNS IN NEW HAVEN CO.	ORDER 1.—Miasmatic.												ORDER 2.—ENTHETIC.						ORDER 3.—DIETIC.				TOTAL FOR CLASS I.													
	Measles.	Scarlet Fever.	Diphtheria.	Croup.	Whooping Cough.	Erysipelas.	Puerperal Fever.	Eclampsia.	Carbuncle.	Pyæmia.	Septicæmia.	Dysentery.	Diarrhea.	Cholera Infantum.	Intermittent Fever.	Congestive Fever.	Typho-Malarial Fever.	Remittent Fever.	Rheumatism.	Cerebro-Spinal Meningitis.	Total.				Syphilis.	Hydrophobia.	Stricture.		TOTAL.		Purpura.	Alcoholism.	Intemperance.	Males.	Females.	Total.
																					M.	F.					M.	F.	M.	F.						
NEW HAVEN..	1	29	55	42	3	13	8	4	1	1	..	3	3	53	3	..	6	2	2	3	110	122	2	..	..	1	1	1	1	..	3	111	126	237		
Beacon Falls..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1	
Bethany..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	7	..	..	..	..	..	..	..	..	..	..	5	7	12	
Branford..	3	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	4	1	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	1	..	
Cheshire..	3	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	3	2	..	..	..	..	..	..	..	..	..	..	1	..	4	2	6
Derby..	49	1	2	1	..	..	..	..	..	1	2	1	7	..	..	1	9	1	4	38	41	..	..	..	..	..	..	..	..	..	..	..	1	38	42	80
East Haven..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	1	..	..	..	..	..	..	..	..	..	..	..	3	1	4	
Guilford..	1	..	..	3	..	..	..	..	..	..	..	..	..	1	..	..	12	..	..	9	3	2	..	..	..	..	..	..	..	..	..	..	3	2	5	
Hamden..	..	2	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	9	8	..	..	..	..	..	..	..	..	..	..	..	9	8	17	
Madison..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	3	..	3	
Meriden..	28	23	21	8	3	2	1	..	..	..	4	2	25	3	..	..	2	1	..	68	62	..	..	1	1	..	..	..	..	..	..	..	70	62	132	
Middlebury..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10	9	..	..	..	..	..	..	..	..	..	..	..	10	9	19		
Milford..	12	2	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	3	10	7	..	..	..	..	..	..	..	..	..	..	10	7	17		
Naugatuck..	5	1	4	..	..	..	..	..	..	..	..	..	7	..	..	..	..	..	10	7	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	
North Branford..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	
North Haven..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	1	..	3	1	..	4	..	..	..	..	..	..	..	..	..	..	..	3	4	7		
Orange..	..	..	1	..	..	..	..	..	..	..	..	1	6	..	..	3	..	..	4	7	..	..	..	..	..	..	..	..	..	..	..	4	7	11		
Oxford..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..	3	3	..	..	..	..	..	..	..	..	..	..	..	3	3	6		
Prospect..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Seymour..	1	1	4	1	..	..	1	3	..	..	..	..	..	..	..	..	..	..	6	5	..	..	..	..	..	..	..	..	..	..	..	6	5	11		
Southbury..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	3	..	..	..	..	..	1	1	..	..	..	..	4	..	4		
Wallingford..	5	1	1	1	..	..	..	..	..	..	..	1	2	1	..	4	1	..	11	7	..	..	..	..	..	..	..	..	..	..	1	12	7	19		
Waterbury..	1	6	3	14	4	1	..	..	..	..	2	..	14	..	3	..	..	..	27	21	..	..	..	..	..	..	..	..	..	..	..	28	21	49		
Wolcott..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1		
Woodbridge..	..	..	..	1	2	..	..	..	..	..	..	..	1	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	4	4	
Totals.....	3	133	103	70	70	55	21	8	2	1	..	1	11	120	11	1	50	7	5	11	322	316	2	1	1	3	1	2	1	..	5	4	4	329	321	650

CLASS II.—CONSTITUTIONAL DISEASES.										CLASS III.—LOCAL DISEASES.																													
TOWNS IN NEW HAVEN CO.		ORDER 1.— DIATHETIC.				ORDER 2.—TUBERCULAR.				TOTAL FOR CLASS II.		ORDER 1.—NERVOUS SYSTEM.								ORDER 2.—ORGANS OF CIRCULATION.		ORDER 3.—RESPIRATORY SYSTEM.																	
		Dropsy, Anæmia.	Cancer.	Total.	Scrofula.	Marasmus.	Phthisis.	Hydrocephalus.	Meningitis.	M.	F.	Males.	Females.	Total.	Apoplexy.	Paralysis.	Insanity.	Epilepsy.	Tetanus.	Convulsions.	Meningitis.	Brain Disease.	Spinal Disease.	Total.	Pericarditis.	Aneurism.	Heart Disease.	Angina.	Total.	Laryngitis.	Bronchitis.	Pleurisy.	Pneumonia.	Asthma.	Lung Disease.	M. F.	Total.		
New Haven...	7 26	9 24	3 29	166	4	88	114	97	138	235	3	3	32 29	3	2	3	61	44	24	107	91	1	63	46	18	4	25	61	12	55	47								
Beacon Falls...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Bethany...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Branford...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cheshire...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Derby...	2 6	2 6	1 4	17	2 1	14	11	16	17	33	3	3	3 2	1	1	1	11	1	1	9	11	6	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
East Haven...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Guilford...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hamden...	2 1	1 2	1 3	3	3	3	2	4	4	8	2	2	3 4	1	1	1	3	2	2	5	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Madison...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Meriden...	10 4	6 8	1 6	38	4	23	26	29	34	63	5	7	1	1	1	12	13	9	25	22	1	4	2	3	1	4	12	5	8	14	1	1	1	1	1	1	1	1	1
Middlebury...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Milford...	2 3	1 4	15	1	7	8	8	12	20	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Naugatuck...	1	2	2	1	7	2	5	4	6	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
North Branford...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
North Haven...	1	2	1	3	1	4	3	4	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Orange...	4 2	1 5	2	2	1	1	1	2	6	8	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Oxford...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Prospect...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Seymour...	2 3	5	1 6	1	6	5	2	5	7	12	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Southbury...	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Wallingford...	2 4	1 3	4	6	1	1	5	4	9	13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Waterbury...	5 7	5 7	37	1	37	21	17	26	24	50	8	7	1	1	1	16	12	9	30	22	13	13	8	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Wolcott...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Woodbridge...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Totals.....	43 64	336 74	844 327	12	1	1 176	220	213	293	506	65	64	3	4	5	115	73	61	213	177	2	3 108	68	45	8	32	2 112	32	89	96									



CLASS IV. -- DEVELOPMENTAL DISEASES.										CLASS V. -- VIOLENT DEATHS.										GRAND TOTAL FOR ALL CLASSES.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
ORDER 1. -- OF CHILDREN.				ORDER 2. -- OF WOMEN.		ORDER 3. -- OF OLD PEOPLE.		ORDER 4. -- OF NUTRITION.		TOTAL FOR CLASS IV.		ORDER 1. -- ACCIDENT OR NEGLIGENCE.				ORDER 2, 3, 4.						TOTAL FOR CLASS V.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Stillborn.	Premature Birth and Debility.	Cyanosis.	Spina Bifida.	Malformation.	Teething.	Total.		Methitis.	Childbirth.	Total.	Old Age.		Atrophy and Debility.		Males.	Females.	Total.	Fractures.	Wounds.	Burns and Scalds.	Poison.	Drowning.	Accidents.	Railway Injury.	Suffocation.	Otherwise.	Total.		Order 3 -- Homicide.	Order 4 -- Suicide.	Sudden Cause.		Males.	Females.	Total.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
						M.	F.				M.	F.	M.	F.													M.	F.			M.	F.				M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.







CLASS II.—CONSTITUTIONAL DISEASES.										CLASS III.—LOCAL DISEASES.																															
ORDER 1.— DIATHETIC.				ORDER 2.—TUBERCULAR.				TOTAL FOR CLASS II.				ORDER 1.—NERVOUS SYSTEM. OF CIRCULATION.						ORDER 2.—ORGANS ORDER 3.—RESPIRATORY SYSTEM.																							
Dropsy and Anæ- mia.	Cancer.	Mortification.		Scrophula.	Marasmus.	Phthisis.	Hydrocephalus.	Peritonitis.	Meningitis.	Total.		Males.	Females.	Total.	Apoplexy.	Paralysis.	Insanity.	Chorea.	Epilepsy.	Tetanus.	Convulsions.	Meningitis.	Brain Disease.	Spinal Disease.	Total.		Pericarditis.	Aneurysm.	Heart Disease.	Angina.	Total.		Laryngitis.	Pleurisy.	Pneumonia.	Asthma.	Lung Disease.	Total.			
		M.	F.							M.	F.														M.	F.					M.	F.									
NEW LONDON..	4	9	5	8	3	31	1	1	1	14	21	19	29	48	3	4	2	1	1	1	1	1	1	4	1	4	7	11	3	1	1	1	1	5	3	4					
NORWICH.....	3	8	7	4	4	94	13	1	1	47	64	54	68	122	9	27	1	1	2	19	9	2	40	29	10	7	6	11	32	1	10	7	1	1	1	1	1	17	16		
Bozrah.....	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Colchester...	1	3	1	3	1	12	1	1	1	5	7	6	10	16	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
East Lyme...	1	1	1	1	1	1	1	1	1	2	3	2	3	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Franklin.....	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Griswold.....	3	3	4	2	10	1	1	5	1	4	2	4	2	6	1	4	1	1	1	1	1	1	2	5	3	4	2	2	1	1	1	1	1	1	1	1	1	1	1		
Groton.....	2	2	2	2	2	2	2	2	2	5	5	9	7	16	2	3	1	1	1	1	1	1	2	5	3	4	2	2	1	1	1	1	1	1	1	1	1	1	1	1	
Lebanon.....	2	2	2	2	2	2	2	2	2	2	2	2	2	4	2	5	4	2	1	1	1	1	2	4	5	3	1	2	1	1	1	1	1	1	1	1	1	1	1	1	
Ledyard.....	2	2	2	2	2	2	2	2	2	2	2	2	2	4	2	1	1	1	1	1	1	1	2	4	5	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Lisbon.....	2	2	2	2	2	2	2	2	2	2	2	2	2	4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Lyme.....	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Montville.....	1	1	1	1	3	1	1	3	1	3	3	3	4	7	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
No. Stonington.	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Old Lyme.....	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Preston.....	1	1	1	1	1	7	1	1	1	3	4	4	4	8	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Salmon.....	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Sprague.....	2	2	2	1	12	1	1	6	7	8	7	15	2	2	1	1	1	1	1	1	1	1	1	3	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1
Stonington...	2	4	2	4	7	1	1	5	3	7	7	14	2	1	2	1	1	1	1	1	1	2	1	1	5	2	1	5	2	4	1	1	1	1	1	1	1	1	1	1	1
Waterford.....	1	1	1	1	3	1	1	1	2	1	2	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Totals.....	17	38	1	26	30	8	209	16	102	131	129	160	289	27	53	9	5	34	12	18	29	4	60	1	39	25	1	5	60	1	93	1	45	1	1	1	1	1	1	1	1

### CLASS III. — LOCAL DISEASES — Concluded.

[illegible]

[illegible]

## CLASS I.—ZYMOTIC DISEASES.

TOWNS IN FAIRFIELD Co.	ORDER 1.—MIASMATIC.														ORDER 2.—ENTHETIC.						ORDER 3.—DIETIC.				TOTAL FOR CLASS I.											
	Measles.	Scarlet Fever.	Diphtheria.	Croup.	Whooping Cough.	Erysipelas.	Puerperal Fever.	Eclampsia.	Carbuncle.	Pyæmia.	Septicæmia.	Dysentery.	Diarrhea.	Cholera Infantum.	Intermittent Fever.	Congestive Fever.	Typho-Malarial Fever.	Remittent Fever.	Rheumatism.	Total.		Syphilis.	Hydrophobia.	Stricture.	Total.		Privation.	Alcoholism.	Intemperance.	Total.		Males.	Females.	Total.		
																				M.	F.				M.	F.										
DANBURY.....	2	2				2								1	7				1	2	9	8										9	8	17		
Bridgeport.....	8	75	20	1	9	4							6	12	2				2	1	82	59										2	2	84	61	145
Bethel.....		1			1									3							1	4											1	4	5	
Brookfield.....																																				
Darien.....		3												1	1							3	3											3	3	6
Easton.....														1							1												1		1	
Fairfield.....														1																						
Greenwich.....	2	1			2	1							1		3	2			1	1	6	7											6	7	13	
Huntington.....	2	1			1									1							3	2											3	2	5	
Monroe.....																																				
New Canaan.....														1	1						5												5		5	
New Fairfield.....														1				2			2	1										2	1	3		
Newtown.....														1							1	1											1	1	2	
Norwalk.....	1	5	4	1	5	1							1	1	1			3	1	3	27	13	1									1	29	13	42	
Reading.....														1	1						1	3											1	3	4	
Ridgefield.....														1								1												1	1	1
Sherman.....																																		1		1
Stamford.....	7	14	2	1	2								2	3	5			4	5	3	24	25										1	1	25	25	50
Stratford.....															1				1		3	5											3	5	8	
Trumbull.....															1						3	6											3	6	9	
Weston.....																																				
Westport.....															2			3	1		4	2											4	2	6	
Wilton.....	1																				1	2												1	2	3
Totals.....	121	109	32	3	28	9	4		1		13	7	54	9			12	5	9	10	177	148	1		1		4	1	4	2	182	150	332			





CLASS III.—LOCAL DISEASES—Concluded.

[illegible]



[illegible]

## CLASS I.—ZYMOTIC DISEASES.

TOWNS IN WINDHAM CO.	ORDER 1.—MIASMATIC.																	ORDER 2.—ENTHETIC.						ORDER 3.—DIETIC.				TOTAL FOR CLASS 1.															
	Measles.	Scarlet Fever.	Diphtheria.	Croup.	Whooping Cough.	Typhoid Fever.	Erysipelas.	Puerperal Fever.	Eclampsia.	Carbuncle.	Pyæmia.	Septicæmia.	Influenza.	Dysentery.	Diarrhea.	Cholera.	Cholera Infantum.	Intermittent Fe- ver.	Typho-Malarial Fever.	Remittent Fever.	Rheumatism.	Cerebro-Spinal Meningitis.	TOTAL.		Syphilis.	Hydrophobia.	Stricture.			TOTAL.		Purpura.	Alcoholism.	Intemperance.	TOTAL.								
																							M.	F.				M.	F.	M.	F.												
	BROOKLYN.....	...	...	...	3	...	2	...	...	...	1	...	...	...	...	...	...	2	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	6	8							
Ashford.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...								
Canterbury.....	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	2	...	2							
Chaplin.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	2	...	2							
Eastford.....	2	3	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	4	3	...	...	...	...	...	...	...	...	1	4	4	8							
Hampton.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...	2	...	2					
Killingly.....	...	2	1	...	...	...	...	...	...	...	...	...	...	...	5	...	...	...	...	...	...	...	...	9	8	...	...	...	...	...	...	...	...	...	...	11	8	19					
Plainfield.....	...	...	...	3	...	...	...	...	...	...	...	...	...	...	2	1	...	...	...	...	...	...	3	5	...	...	...	...	...	...	...	...	...	...	...	3	5	8					
Pomfret.....	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	3				
Putnam.....	3	1	3	...	...	13	...	...	...	...	...	...	...	3	4	3	7	...	...	...	...	...	16	26	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	17	26	43	
Scotland.....	...	...	3	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2	4			
Sterling.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		
Thompson.....	4	...	5	...	...	1	...	...	...	...	...	...	...	...	1	7	...	...	...	...	...	...	9	9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	9	9	18		
Voluntown.....	...	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Windham.....	...	...	2	7	...	3	...	...	...	...	...	...	...	2	...	...	9	...	...	...	...	...	12	16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	12	16	28
Woodstock.....	...	...	3	1	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	5	5
Totals.....	7	4	20	17	6	27	1	1	1	1	1	1	1	7	8	4	32	1	1	5	5	3	69	83	...	...	...	...	2	2	...	...	...	...	...	...	...	...	...	...	73	89	157

CLASS II.—CONSTITUTIONAL DISEASES.										CLASS III.—LOCAL DISEASES.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
ORDER 1.— DIATHETIC.			ORDER 2.—TUBERCULAR.			TOTAL FOR CLASS II.		ORDER 1.—NERVOUS SYSTEM.						ORDER 2.—ORGANS OF CIRCULATION.				ORDER 3.—RESPIRATORY SYSTEM.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
Dropsy, Anæmia.	Mortification.		Total.	Scrofula.	Marasmus.	Phthisis.	Hydrocephalus.	Peritonitis.	Meningitis.	Total.		Males.	Females.	Total.	ORDER 1.—NERVOUS SYSTEM.						ORDER 2.—ORGANS OF CIRCULATION.				ORDER 3.—RESPIRATORY SYSTEM.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
	M. F.	F.								M. F.	F.				Cephalitis.	Apoplexy.	Paralysis.	Insanity.	Tetanus.	Convulsions.	Meningitis.	Brain Disease.	Spinal Disease.	Total.	Pericarditis.	Aneurism.	Angina.	Total.	Laryngitis.	Pneumonia.	Asthma.	Lung Disease.	M. F.	F.	Total.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
BROOKLYN.....	1	1	1	1	1	4	2	5	3	8	1	1	1	1	1	1	1	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1





## CLASS 1.—ZYMOTIC DISEASES.

TOWNS IN LITCHFIELD CO.	ORDER 1.—MIASMATIC.												ORDER 2.—ENTHETIC.						ORDER 3.—DIETIC.				TOTAL FOR CLASS 1.																
	Measles.	Scarlet Fever.	Diphtheria.	Croup.	Whooping Cough.	Typhoid Fever.	Erysipelas.	Puerperal Fever.	Eclampsia.	Carbuncle.	Pyæmia.	Septicæmia.	Influenza.	Dysentery.	Diarrhœa.	Cholera.	Cholera Infantum.	Intermittent Fe- ver.	Typho-Malarial Fever.	Rheumatism.	Cerebro-Spinal Meningitis.	TOTAL.			Syphilis.	Hydrophobia.	Stricture.	TOTAL.		Privation.	Alcoholism.	Intemperance.	TOTAL.		Males.	Females.	TOTAL.		
																						M.	F.	M.				F.	M.				F.						
LITCHFIELD...	2				6									3									4	7										4	7	11			
Barkhamsted...	1																						2										2						
Bethlehem...																																							
Bridgewater...																							1																
Canaan...	1																						1																
Colebrook...																							1																
Cornwall...																							1																
Goshen...					2																		1																
Harwinton...	1																						3	1															
Kent...					1																		2	1															
Morris...	1																						1																
New Hartford...	2				1																		3	5															
New Milford...	1				2																		2	3															
Norfolk...																								2	3														
North Canaan...	4		2																				2	4															
Plymouth...	2																						4	2															
Roxbury...					1																			4	2														
Salisbury...	1				1																		1	5															
Sharon...	2				4																		1	5															
Thomaston...	1																						1	5															
Torrington...	2				3																		4	1															
Warren...	4																						9	3															
Washington...	1																						3	2															
Watertown...																							1	1															
Winchester...	7	20	1		1																		17	19															
Woodbury...					3																		1	2															
Totals.....	11	44	6	1	27	3	1			11	6	15	3	2									5	74	63		1										75	64	139



## REPORT OF THE STATE BOARD OF HEALTH.

[illegible]

### CLASS III.—LOCAL DISEASES—Concluded.

[illegible]

TOWNS  
IN  
LITCHFIELD CO.

[illegible]





### CLASS III.—LOCAL DISEASES—Concluded.

[illegible]

7



[illegible]

## CLASS I.—ZYMOTIC DISEASES.

TOWNS IN TOLLAND Co.	ORDER 1.—MIASMATIC.																ORDER 2.—ENTHETIC.				ORDER 3.—DIETIC.				TOTAL FOR CLASS I.															
	Measles.	Scarlet Fever.	Diphtheria	Croup.	Whooping Cough.	Typhoid Fever.	Erysipelas.	Puerperal Fever.	Eclampsia.	Carbuncle.	Pyæmia.	Septicæmia.	Influenza.	Dysentery.	Diarrhea.	Cholera Infantum.	Intermittent Fever.	Typho-Malarial Fever.	Remittent Fever.	Rheumatism.	Cerebro-Spinal Meningitis.	TOTAL.		Syphilis.	Hydrophobia.	Stricture.	TOTAL.		Privation.	Purpura.	Alcoholism.	Intemperance.	TOTAL.		Males.	Females.	TOTAL.			
																						M.	F.				M.	F.												
TOLLAND .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1	1	1	..	..	..	..	..	..	..	..	..	..	..	1	1	2		
Andover .....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	1	..	..	..	..	..	..	1	..	..	..	..	..	2	1	3	
Bolton .....	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..	1	1	2	
Columbia .....	..	..	2	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	4	1	1	1	..	..	..	..	..	..	..	..	..	..	..	4	..	4	4
Coventry .....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	2	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1
Ellington .....	..	..	..	..	..	1	..	..	..	..	..	..	1	1	..	..	1	..	..	..	..	..	2	2	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2	2
Hebron .....	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1
Mansfield .....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2	2
Somers .....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1
Stafford .....	..	..	2	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	2	2	2	..	..	..	..	..	..	..	..	..	..	..	2	2	4	4
Union .....	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1
Vernon .....	..	..	1	3	7	..	..	..	..	..	..	..	..	..	3	6	..	..	..	..	1	2	17	9	1	1	1	1	1	1	1	1	1	1	1	18	10	28		
Willington .....	..	..	..	..	2	..	..	..	..	..	..	..	..	..	1	1	1	..	..	..	..	3	2	..	..	..	..	..	..	..	..	..	..	..	..	..	3	2	5	5
Totals .....	5	5	5	3	15	..	..	..	..	..	..	..	1	2	5	12	..	..	..	1	3	29	23	..	..	..	..	..	1	1	2	3	1	32	24	56				

[illegible]

### CLASS III.—LOCAL DISEASES—Concluded.

[illegible]



## Recapitulation of Table 2.

CAUSES OF DEATH.	Hartford Co.	New Haven Co.	New London Co.	Fairfield Co.	Windham Co.	Litchfield Co.	Middlesex Co.	Tolland Co.	TOTAL.		PER CENT. TO TOTAL MORTALITY.		
									1878.	1877.	1878.	1877.	
ZYMOTIC DISEASES.													
Order 1, Miasmatic.....	416	638	258	325	152	137	129	52	2107	2321	22.51	25.49	
“ 2, Enthetic.....	9	4	1	1	...	1	...	4	20	18	.22	.19	
“ 3, Dietic.....	7	8	7	6	5	1	1	...	35	41	.37	.46	
Total, Class I.....	432	650	266	332	157	139	130	56	2162	2380	23.10	26.14	
CONSTITUTIONAL DISEASES.													
Order 1, Diathetic.....	72	110	56	69	33	33	31	15	419	394	4.49	4.34	
“ 2, Tubercular.....	311	396	233	194	120	91	87	48	1480	1551	15.90	17.03	
Total, Class II.....	383	506	289	263	153	124	118	63	1899	1945	20.39	21.37	
LOCAL DISEASES.													
Order 1, Nervous System... ..	216	390	160	180	63	84	87	44	1224	1177	13.09	12.75	
“ 2, Organs of Circulation..	72	113	64	81	35	28	37	25	455	429	4.87	4.92	
“ 3, Organs of Respiration..	145	185	76	120	46	49	35	30	686	782	7.34	8.78	
“ 4, Organs of Digestion...	51	101	38	62	31	23	23	14	343	390	3.67	4.24	
“ 5, Urinary Organs.....	54	59	24	27	14	15	12	8	213	187	2.28	2.05	
“ 6, Generative Organs.....	4	6	...	4	...	1	2	3	20	36	.22	.39	
“ 7, Organs of Locomotion..	2	2	1	1	...	3	2	...	11	30	.12	.32	
“ 8, Integumentary System..	9	5	2	2	...	3	2	...	23	52	.24	.54	
Total, Class III.....	553	861	365	477	189	206	200	124	2975	3093	31.83	33.98	
DEVELOPMENTAL DISEASES.													
Order 1, Of Children.....	60	221	69	77	54	20	19	20	540	552	5.77	6.07	
“ 2, Of Women.....	23	5	7	12	2	4	3	3	59	74	.64	.81	
“ 3, Of Old People.....	108	113	82	107	40	42	32	18	542	476	5.78	3.23	
“ 4, Of Nutrition.....	36	26	20	23	10	2	8	2	127	220	1.36	2.41	
Total, Class IV.....	227	365	178	219	106	68	62	43	1268	1322	13.55	14.52	
VIOLENT DEATHS.													
Order 1, Accident.....	78	109	43	49	13	29	19	13	353	283	3.76	3.10	
“ 3, Homicide.....	1	5	...	3	1	2	1	...	13	10	.13	.11	
“ 4, Suicide.....	8	17	7	11	3	2	7	3	58	52	.61	.57	
Sudden, Cause unascertained ...	7	5	5	13	...	4	2	...	36	19	.37	.21	
Cause not stated.....	211	44	117	89	65	31	16	15	588	592	6.27	.....	
Total, Class V.....	305	180	172	165	82	68	45	31	1048	956	11.13	.....	
Grand Total.....	1900	2562	1270	1456	687	605	555	317	9352	9696	100.00	100.00	



TABLE 3.

CAUSES OF DEATH BY MONTHS, AGE, AND SEX.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Unknown.	DISEASE.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Males.	Females.	Unknown.	Total.	
														Abscess.....					1	1	1	1	1	1	1	1	1	1	2	3	3	5
7	3	2	6	4	9	6	5	2	3	12	6			Accident.....	8	5	9	4	7	4	4	9	4	9	2				49	16		65
1	1	1	2	5	1					4	4	2		Alcoholism.....					4	3	5	8						15	5		20	
3	3	1			2	3	3							Aneurism.....					3	3	3		1	2				10	2		12	
2			1											Angina Pectoris.....						1	1	1						2	1		3	
24	23	26	24	16	21	22	21	18	20	30	22			Apoplexy.....				3	22	20	62	56	64	27	12	1	160	107			267	
2		1			1	2			3	1	1			Ascites.....	1	3				1		4	3	2				7	3		10	
	1	1	2	2	1		1	1	1					Asthma.....			2		2	1	2	1	1	1				4	6		10	
						2								Arthritis.....						1			2					2	1		3	
15	17	22	13	28	20	20	21	27	18	14	15			Brain, Disease of.....	43	54	17	13	11	23	16	14	17	21	2			125	106		231	
7	2	17	8	13	2	4	5	3	4	16	2			Brucellosis.....	9	8	7		1	3	5	3	14	15	3			33	50		83	
20	6	12	12	8	5	6	4	8	10	9	10			Bright's Disease.....			1	4	12	8	13	32	35	15	1			75	35		110	
3	1	8	4	3	2	3		12	3	4	3			Burns and Scalds.....	2	16	4	4	4		6	3						23	20		43	
18	19	20	15	21	22	18	28	21	30	14	19			Cancer.....		1	1		4	16	56	58	54	36	19			75	170		245	
1	2	2							1	1				Carbuncle.....				1			1	2	1	1				2	4		6	
				1		1	1	1						Calculus.....							1		1					3			3	
3	5	4	3	6	5	6	2	2	5			6		Cerebro-Spinal Meningitis.....	4	7	13	6	14	3							25	22		47		
5	6	5	7	5	6	3	4	7	4	5	6			Childbirth.....				10	20	20	12								62		62	
			3	4	3	12	180	145	60	15				Cholera Infantum.....	326	96												234	188		422	
			1					1						Chorea.....				2											2		2	
36	98	111	123	142	102	99	102	92	100	116	95			Consumption.....	30	28	17	189	332	227	175	120	108	61	9			572	732	12	1316	
2			2	2	5	3	2							Colic.....	4	1	4			3			5								16	
18	12	17	29	20	24	38	22	16	12	30	15			Convulsions.....	140	78	10	8	7	6	4							140	113		253	
33	12	13	11	10	7	5	8	5	17	25	32			Croup.....	40	100	34	4										92	86		178	
1	1	1	2		2									Cyanosis.....	9														6	3		9
		1	3	1	4	2	5		1	1				Cystitis.....					2	2	1	4	5	4				14	4		18	
12	14	13	9	10	9	14	15	5	12	12	12			Debility and Atrophy.....	35	6	1		3	9	8	16	28	29	9			69	38		127	

1	4	2	2	4	2	3	3	2	1	Diabetes	10	12	7	4	6	4	2	2	4	1	1	15	9	22	
...	3	1	1	1	16	19	16	3	...	Diarrhea	31	183	187	43	12	4	5	2	8	2	4	31	29	60	
70	46	24	30	28	29	16	19	26	70	59	47	Diphtheria	6	7	4	3	3	7	22	26	32	16	76	83	159
10	18	14	21	11	7	10	6	16	10	18	Dropsy and Anæmia	1	6	7	13	9	6	4	1	3	...	34	16	50	
4	2	1	3	4	4	12	10	6	2	2	Drowned	4	20	7	6	...	9	3	9	10	15	36	50	86	
1	2	1	1	1	11	39	14	15	1	1	Dysentery	...	...	...	...	2	1	...	2	...	...	3	2	5	
...	...	...	...	...	...	...	...	...	...	...	Embolism	...	...	...	...	...	...	...	...	...	...	...	...	...	
5	1	3	...	4	5	1	9	2	3	5	Enteritis	7	14	4	2	5	4	3	3	...	...	25	20	45	
1	1	1	4	2	5	1	...	...	2	2	Epilepsy	...	1	2	5	5	4	2	1	...	...	8	12	20	
...	...	...	...	...	...	...	...	...	...	...	Epistaxis	...	...	...	1	...	...	...	...	...	...	...	1	1	
...	8	3	5	6	5	4	3	2	8	5	Erysipelas	14	4	1	3	3	5	7	5	5	4	33	23	56	
1	...	...	...	...	...	...	...	...	...	...	Exposure	...	...	...	...	...	...	...	...	...	...	...	...	2	
5	2	2	3	1	3	2	10	10	9	6	Fever, Intermitent and Congestive	3	5	2	7	4	10	3	1	4	7	8	28	26	54
...	...	...	...	...	...	...	...	...	...	...	Fever, Remittent	...	1	2	2	...	1	2	...	2	3	...	5	8	13
24	13	18	17	16	11	9	27	47	28	23	Fever, Typhoid	7	16	15	37	86	27	17	19	15	13	8	140	114	260
4	1	6	3	4	6	7	15	12	7	9	Fever, Typho-Malarial	2	4	3	10	7	10	7	14	13	6	2	48	30	78
5	6	1	3	2	4	6	4	15	3	6	Fracture and Contusions	1	1	5	4	11	8	4	9	6	5	6	48	12	60
1	1	...	...	...	...	...	...	...	...	...	Frozen	...	...	...	1	...	...	...	...	...	1	...	3	...	3
4	3	3	5	10	4	2	6	5	...	2	Gastritis	6	2	...	1	4	2	4	3	9	10	5	22	24	46
9	...	...	...	...	...	...	...	...	...	...	Gangrene	...	...	...	...	...	...	...	...	1	1	1	4	...	4
41	39	34	35	35	30	32	32	16	42	41	Heart Disease	27	9	7	10	19	36	60	54	85	92	25	226	198	424
...	...	...	...	...	...	...	...	...	...	...	Heat, Sunstroke	...	...	...	...	...	...	...	...	...	...	...	4	1	5
6	...	1	2	3	2	3	7	...	...	1	Hemorrhage	6	...	...	5	4	6	4	2	1	2	...	14	16	30
3	...	1	...	...	...	...	...	4	3	...	Hepatitis	3	...	1	...	2	1	...	5	3	...	5	10	15	
1	5	2	...	1	6	1	7	2	4	...	Hernia	...	1	...	1	5	2	6	9	6	...	18	12	30	
...	2	1	1	1	1	2	1	2	1	...	Homicide	...	...	...	...	4	2	1	2	2	1	10	2	12	
2	2	7	2	4	5	9	6	5	4	5	Hydrocephalus	26	21	6	1	...	...	...	...	...	...	35	19	54	
2	1	1	...	...	...	...	...	...	...	...	Hydrophobia	...	...	...	1	...	3	2	1	...	...	6	1	7	
2	4	4	2	2	1	2	5	5	8	4	Insanity	...	...	...	...	3	2	10	12	6	5	2	21	19	40
...	1	1	...	1	1	2	...	...	...	...	Intussusception	...	...	...	...	...	...	...	...	...	...	1	3	2	5
...	1	...	1	1	1	2	...	3	...	...	Jaundice	...	1	...	...	1	1	...	4	3	1	1	3	8	11
2	...	...	...	...	...	...	...	...	...	...	Joint Disease	...	...	1	1	1	1	...	...	...	...	2	3	...	5
1	4	2	2	...	4	8	...	1	4	6	Kidney Disease	...	...	...	2	2	4	9	6	4	6	2	23	12	35
1	...	1	1	2	4	...	...	4	2	...	Laryngitis	3	3	6	1	...	1	...	...	...	...	10	5	15	
...	...	...	...	...	...	...	...	...	...	...	Lightning	...	...	...	1	...	...	...	...	...	...	3	...	3	



30	29	22	25	20	22	19	16	5	9	5	13	...	Scarlatina	...	15	99	75	24	2	...	...	...	...	...	...	...	...	...	...	110	105	...	215
1	3	1	4	5	...	4	7	1	4	...	1	...	Scrofula	...	...	8	7	6	...	...	2	1	4	...	...	...	...	...	...	9	22	...	31
...	1	1	...	...	...	...	...	...	...	...	...	...	Skin Diseases	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2	
...	...	...	...	...	...	...	...	...	...	2	...	...	Spina Bifida	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	3	...	4
...	...	1	1	...	...	...	...	...	...	...	...	...	Spine Diseases	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	2
1	...	...	...	...	...	...	...	...	...	...	...	...	Spleen Diseases	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	2	...	...	2	
8	6	1	4	3	4	5	6	3	5	1	2	...	Stomach Disease	...	3	3	2	4	7	6	5	3	3	4	8	...	...	...	26	22	...	48	
1	2	...	...	...	...	...	...	...	...	...	2	...	Stricture and Obstruction Intestine	...	2	1	1	1	...	...	...	2	1	3	...	...	...	...	7	4	...	11	
...	...	...	...	...	...	...	...	...	...	...	...	...	Stricture Oesophagus	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	1
29	20	31	28	27	21	27	18	20	28	27	24	...	Stillborn	...	300	...	...	...	...	...	...	...	...	...	...	...	...	...	...	180	120	...	300
7	2	2	1	1	5	5	1	5	4	2	1	...	Suddenly	...	1	2	...	4	1	6	4	7	1	6	...	...	...	...	27	9	...	36	
...	3	2	1	...	2	1	1	...	1	2	...	...	Suffocation	...	1	5	4	...	1	1	...	...	...	...	...	...	...	...	...	5	8	...	13
6	4	5	1	6	3	4	4	6	12	3	1	...	Suicide	...	...	...	2	3	5	7	14	8	11	4	1	...	...	...	36	19	...	55	
...	...	2	3	...	...	...	...	...	...	...	...	...	Syphilis	...	3	4	...	1	...	...	...	...	...	...	...	...	...	...	6	2	...	8	
4	3	4	5	4	3	4	11	10	7	2	5	...	Tabes Mesenterica	...	38	12	1	1	4	...	1	...	1	...	...	...	...	...	...	33	29	...	62
1	2	1	...	...	...	...	...	...	...	...	...	...	Teething	...	10	5	...	...	...	...	...	...	...	...	...	...	...	...	...	10	5	...	15
1	1	...	...	...	...	...	...	...	...	1	2	...	Tetanus	...	4	1	1	1	1	1	...	3	...	...	...	...	...	...	...	8	4	...	12
2	1	2	1	1	1	...	...	...	...	1	...	...	Tumor	...	...	...	1	1	...	1	2	3	2	2	...	...	...	...	8	6	...	14	
...	...	1	...	...	...	...	...	...	...	...	1	...	Ulcer	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	2	...	6
3	2	...	2	1	...	...	...	...	...	...	...	...	Ulcer Intestines	...	...	...	1	1	3	...	1	...	2	1	1	...	...	...	7	4	...	11	
...	...	...	...	...	...	...	...	...	...	...	...	...	Uraemia	...	...	...	...	3	2	2	3	13	...	...	...	...	...	...	...	8	4	...	12
...	...	...	...	...	...	...	...	...	...	...	...	...	Uterus, Disease of	...	...	...	...	2	2	3	1	...	...	...	...	...	...	...	...	...	8	...	8
13	7	16	2	...	...	...	...	...	...	7	2	...	Whooping Cough	...	35	28	5	...	...	...	...	...	...	...	...	...	...	...	...	25	43	...	68
...	...	...	...	...	...	...	...	...	...	...	...	...	Worms	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	2
8	1	3	1	3	1	2	1	2	2	...	2	...	Wounds	...	1	3	4	4	6	4	1	2	...	...	...	...	...	...	...	21	5	...	26
...	...	...	...	...	...	...	...	...	...	...	...	...	Killed by Tornado	...	2	1	5	8	3	3	5	3	...	...	...	...	...	...	...	15	15	...	30

TABLE 4.

DEATHS IN TOWNS. ALPHABETICAL ARRANGEMENT,  
DISTINGUISHED BY NATIONALITY, AGE, AND SEX.

NAME OF TOWN.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	Birthplace, Connecticut.	Other States.	Birthplace, Ireland.	Birthplace, Germany.	Birthplace, England.	Other Foreign Countries.	Unknown.	Males.	Females.	Unknown.	Total.
Andover.....	2	1	..	..	1	..	..	..	..	..	3	..	..	..	6	..	1	..	1	2	..	3	4	..	7
Ashford.....	2	1	..	1	1	..	2	..	3	4	..	1	..	..	11	1	..	..	1	2	..	10	5	..	15
Avon.....	2	..	..	2	2	..	..	..	..	5	2	1	..	..	12	..	1	1	..	..	..	6	8	..	14
Barkhamsted....	1	1	1	2	..	1	..	..	1	2	3	1	..	..	11	1	..	..	1	..	..	7	6	..	13
Beacon Falls....	..	2	..	..	1	1	..	..	1	..	1	..	..	..	3	3	..	..	..	..	..	..	6	..	6
Berlin.....	7	1	..	1	4	1	3	..	1	4	5	..	..	..	25	1	1	..	..	..	..	18	9	..	27
Bethany.....	1	..	..	..	..	..	..	..	1	2	..	1	..	..	5	..	..	..	..	..	..	4	1	..	5
Bethel.....	8	2	..	3	6	4	2	1	1	4	8	..	..	..	28	5	4	..	..	2	..	16	23	..	39
Bethlehem.....	2	..	..	..	2	..	..	1	1	..	..	..	..	..	6	..	..	..	..	..	..	5	1	..	6
Bloomfield.....	..	..	..	1	1	1	1	1	4	4	2	1	..	..	8	..	1	..	1	6	..	7	9	..	16
Bolton.....	1	2	..	..	1	1	..	2	2	1	..	..	..	..	7	2	1	..	..	..	..	6	4	..	10
Bozrah.....	3	12	1	..	..	..	1	..	1	..	..	..	..	..	4	..	1	..	1	..	..	2	4	..	6
Branford.....	12	5	8	2	6	3	4	4	2	2	1	..	..	..	41	3	2	..	1	2	..	22	27	..	49
Bridgeport.....	94	114	50	22	19	22	20	14	24	16	9	5	..	..	260	60	35	8	5	31	..	208	185	6	399
Bridgewater....	..	..	..	..	..	2	..	..	..	..	4	..	..	..	6	..	..	..	..	..	..	3	3	..	6
Bristol.....	7	3	1	4	5	5	10	3	10	7	3	6	..	..	51	3	7	..	3	..	..	33	31	..	64
Brookfield.....	1	..	..	4	..	1	2	..	2	3	1	..	..	..	14	..	..	..	..	..	..	7	7	..	14
Brooklyn.....	6	5	1	1	3	3	1	1	3	5	2	..	..	..	21	5	1	..	..	4	..	16	15	..	31
Burlington.....	..	..	..	..	3	1	2	6	4	4	1	..	..	..	17	1	1	..	2	..	..	14	7	..	21
Canaan.....	1	..	1	..	2	1	1	2	..	..	1	..	..	..	7	1	1	..	..	..	..	4	5	..	9
Canterbury.....	2	1	..	1	2	..	2	1	4	4	1	..	..	..	17	..	1	..	..	..	..	8	10	..	18
Canton.....	6	8	..	1	..	2	2	3	3	3	5	..	..	..	24	4	2	..	3	..	..	19	14	..	33
Chaplin.....	1	..	..	1	..	..	1	1	1	2	..	..	..	..	6	..	..	..	..	..	..	3	3	..	6
Chatham.....	1	..	2	..	3	..	4	2	4	9	3	..	..	..	27	1	..	..	..	..	..	13	15	..	28
Cheshire.....	1	1	1	2	6	3	..	5	5	6	..	..	..	..	26	3	3	..	3	..	..	16	19	..	35
Chester.....	5	1	..	1	3	..	2	1	4	2	1	1	..	..	15	2	3	..	1	..	..	13	8	..	21
Clinton.....	3	..	3	..	1	2	3	5	3	4	..	..	..	..	19	2	..	..	3	..	..	10	14	..	24
Colchester.....	..	8	18	4	9	1	4	3	4	8	4	1	..	..	48	..	5	1	..	10	..	34	30	..	64
Colebrook.....	..	..	..	..	2	1	1	1	1	3	..	..	..	..	5	1	1	..	2	..	..	4	5	..	9
Columbia.....	..	1	2	1	2	3	..	1	5	2	..	..	..	..	13	1	2	1	..	..	..	11	6	..	17
Cornwall.....	3	1	..	..	1	..	1	3	4	2	..	..	..	..	15	..	..	..	..	..	..	7	8	..	15
Coventry.....	3	1	..	1	3	..	3	3	2	6	3	..	..	..	14	2	5	..	..	..	..	13	12	..	25
Cromwell.....	1	7	2	..	2	2	3	1	5	3	4	..	..	..	19	2	3	2	..	4	..	13	17	..	30
Danbury.....	31	16	5	5	6	10	15	6	6	16	11	4	..	..	71	25	9	1	..	25	..	70	57	4	131
Darien.....	4	2	..	1	4	..	3	2	2	1	5	1	..	..	16	9	..	..	..	..	..	14	11	..	25
Derby.....	20	52	26	10	18	13	8	6	12	6	6	1	..	..	130	16	19	3	5	5	..	86	92	..	178
Durham.....	..	1	..	3	..	..	..	3	6	2	..	..	..	..	10	..	..	..	5	..	..	8	7	..	15
Eastford.....	1	2	3	..	3	..	2	..	6	4	1	..	1	..	18	4	1	..	..	..	..	12	11	..	23
East Granby....	3	..	1	2	2	1	1	..	2	3	1	..	..	..	10	3	2	..	..	..	..	7	9	..	16
East Haddam....	3	4	1	..	4	1	2	3	5	9	8	5	1	..	41	3	1	..	1	..	..	28	18	..	46
East Hartford....	11	3	2	1	2	4	7	5	7	5	4	..	..	..	44	1	6	1	..	3	..	28	27	..	55
East Haven.....	9	..	..	..	2	..	2	2	3	8	3	..	..	..	23	..	..	..	4	2	..	18	11	..	29
East Lyme.....	7	1	1	..	1	5	..	3	4	5	2	2	..	..	18	1	..	..	12	..	..	13	16	2	31
Easton.....	2	..	..	..	1	1	2	2	2	3	1	..	..	..	12	..	..	..	..	..	..	4	8	..	12
East Windsor....	11	..	2	2	2	2	..	2	3	5	..	..	..	..	23	1	1	1	..	3	..	15	14	..	29



TABLE 4.—CONTINUED.

NAME OF TOWN.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	Birthplace, Connecticut.	Other States.	Birthplace, Ireland.	Birthplace, Germany.	Birthplace, England.	Other Foreign Countries.	Unknown.	Males.	Females.	Unknown.	Total.
Ellington.....	1	...	...	1	...	...	4	2	2	2	...	1	...	...	9	1	3	...	...	...	4	9	...	13	
Enfield.....	19	15	12	17	14	15	8	5	6	8	4	1	1	...	87	5	21	...	4	8	43	81	1	125	
Essex.....	2	2	...	2	1	1	1	2	1	1	1	1	...	...	13	2	...	...	...	...	10	5	...	15	
Fairfield.....	1	4	2	1	...	4	2	5	6	9	6	1	...	...	35	2	3	...	1	...	13	28	...	41	
Farmington.....	5	5	...	3	4	4	4	6	5	5	2	2	...	...	31	6	4	...	1	3	19	26	...	45	
Franklin.....	...	2	1	...	...	...	2	1	2	1	...	...	...	...	8	1	...	...	...	...	7	2	...	9	
Glastonbury.....	3	2	...	...	...	4	3	5	6	14	6	1	...	...	32	4	1	1	1	5	21	23	...	44	
Goshen.....	2	1	...	1	1	...	...	...	1	3	2	...	...	...	9	2	...	...	...	...	6	4	1	11	
Granby.....	2	1	6	1	4	3	4	5	4	1	1	...	...	...	27	4	1	...	...	...	15	17	...	32	
Greenwich.....	8	4	5	1	5	4	7	4	8	15	10	5	...	...	49	18	4	3	...	2	42	34	...	76	
Griswold.....	7	1	2	3	2	...	2	2	2	3	4	...	...	...	20	5	3	1	...	...	18	11	...	29	
Groton.....	8	6	...	3	4	3	5	6	6	14	5	2	...	...	50	8	...	2	1	...	37	23	1	61	
Guilford.....	4	5	...	4	3	2	...	3	5	5	7	...	...	...	34	3	...	...	...	1	18	20	...	38	
Haddam.....	3	1	2	2	1	4	...	4	2	5	2	...	...	...	26	...	...	...	...	...	12	14	...	26	
Hamden.....	7	3	2	1	...	4	4	2	7	12	3	...	...	...	27	3	6	...	2	7	22	22	1	45	
Hampton.....	...	...	1	3	...	2	1	1	1	1	4	1	...	...	9	5	1	...	...	...	6	9	...	15	
Hartford.....	147	80	25	42	75	93	77	41	44	59	28	11	...	34	450	95	140	15	16	10	384	366	6	756	
Hartland.....	...	...	...	2	1	...	...	...	1	2	...	...	...	...	*6	...	...	...	...	...	3	3	...	6	
Harwinton.....	1	3	...	...	1	2	...	...	7	1	...	...	...	...	14	...	1	...	...	...	6	9	...	15	
Hebron.....	1	...	...	...	...	...	...	3	1	3	3	1	...	...	12	...	...	...	...	...	6	6	...	12	
Huntington.....	3	3	...	2	2	4	...	1	8	5	2	1	...	...	24	4	2	...	...	1	15	16	...	31	
Kent.....	...	1	...	...	...	...	2	2	1	3	2	...	...	...	11	1	...	...	1	...	7	6	...	13	
Killingly.....	42	5	4	5	7	8	2	11	5	6	10	1	...	...	75	14	8	...	3	6	69	37	...	106	
Killingworth.....	1	...	...	...	1	...	...	2	2	2	1	...	...	...	8	1	...	...	...	...	4	5	...	9	
Lebanon.....	...	2	2	4	1	1	2	2	4	...	2	...	...	...	1	14	7	...	...	...	8	13	...	21	
Ledyard.....	4	1	...	1	1	2	1	1	3	6	5	...	...	...	25	...	...	...	...	...	9	16	...	25	
Lisbon.....	3	...	1	...	2	...	1	...	4	3	...	...	...	...	11	1	...	2	...	...	6	8	...	14	
Litchfield.....	8	4	...	2	4	4	1	2	4	3	5	2	...	...	24	6	2	...	1	...	6	16	23	...	39
Lyme.....	3	1	2	1	1	...	1	2	...	5	1	...	...	...	16	1	...	...	...	...	11	6	...	17	
Madison.....	1	...	2	2	5	5	1	2	1	6	1	...	...	...	21	4	...	1	...	...	12	14	...	26	
Manchester.....	12	6	1	2	5	9	4	6	5	11	3	1	...	...	*44	3	12	2	4	...	38	27	...	65	
Mansfield.....	1	1	...	1	...	2	...	2	1	7	6	1	...	...	19	1	1	...	1	...	12	9	1	22	
Marlborough.....	1	...	...	1	...	...	2	1	...	2	...	...	...	...	6	...	1	...	...	...	3	4	...	7	
Meriden.....	93	79	33	18	14	38	18	13	16	11	5	4	1	...	275	5	50	6	15	3	10	189	172	...	361
Middlebury.....	1	...	...	2	...	1	1	1	3	1	1	1	...	...	11	...	...	...	...	...	1	6	...	12	
Middlefield.....	...	2	1	...	...	...	1	...	1	1	2	1	...	...	8	...	1	...	...	...	2	7	...	9	
Middletown.....	29	21	6	13	17	15	18	31	17	22	13	4	...	...	141	15	25	7	7	6	5	91	115	...	206
Milford.....	8	5	11	3	5	4	6	6	7	6	8	...	...	...	57	3	4	1	...	4	31	38	...	69	
Monroe.....	...	...	...	...	...	2	...	...	1	1	1	...	...	...	5	1	...	...	...	...	3	3	...	6	
Montville.....	2	...	...	1	2	...	1	...	2	5	1	1	...	...	14	...	1	...	...	...	5	10	...	15	
Morris.....	1	1	1	...	...	1	...	...	2	4	3	...	...	...	13	...	...	...	...	...	7	6	...	13	
Naugatuck.....	22	8	1	3	7	...	2	3	5	7	1	...	...	...	45	...	8	3	3	...	30	29	...	59	
New Britain.....	40	35	14	11	16	12	15	13	17	7	6	7	...	...	93	23	12	7	4	3	53	97	96	2	195
New Canaan.....	3	2	1	4	2	2	4	3	8	...	...	...	...	...	23	9	...	...	2	1	17	18	...	35	
New Fairfield.....	...	2	...	...	2	...	...	6	2	...	...	...	...	...	11	1	...	...	...	...	6	5	1	12	
New Hartford.....	6	10	2	5	6	3	4	...	6	5	3	...	...	...	29	3	7	2	1	1	7	29	21	...	50
New Haven.....	288	183	60	52	98	95	85	83	88	77	37	7	...	...	750	137	180	15	45	26	585	568	...	1153	

\* Misprint on page 13.



TABLE 4.—CONTINUED.

NAME OF TOWN.	Under 1.	1 to 5.	5 to 10.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Over 100.	Unknown.	Birthplace, Connecticut.	Other States.	Birthplace, Ireland.	Birthplace, Germany.	Birthplace, England.	Other Foreign Countries.	Unknown.	Males.	Females.	Unknown.	Total.
Newington .....	5	1	1	..	1	1	1	..	4	1	1	2	..	..	15	1	2	..	..	..	8	9	1	18	
New London.....	46	23	11	17	16	19	14	14	19	20	5	7	..	..	161	18	17	4	2	9	92	100	19	211	
New Milford.....	6	..	1	2	6	4	3	3	1	3	10	2	..	..	23	2	1	..	15	..	19	22	..	41	
Newtown.....	5	6	2	..	1	4	5	4	1	2	6	3	..	..	32	7	..	..	..	..	21	18	..	39	
Norfolk.....	3	..	1	2	1	..	3	2	3	2	2	1	..	..	13	3	3	..	..	1	6	13	1	20	
North Branford..	..	..	..	1	..	2	1	1	1	1	3	..	..	..	9	..	..	1	..	..	6	4	..	10	
North Caanan....	2	3	3	1	1	3	..	2	2	4	1	..	..	..	19	3	..	..	..	..	13	9	..	22	
North Haven....	6	..	..	..	1	4	..	1	1	6	2	..	..	..	20	..	..	1	..	..	7	14	..	21	
North Stonington.	3	8	12	1	4	3	1	..	..	2	8	5	1	..	45	2	..	..	1	..	26	22	..	48	
Norwalk .....	46	19	7	10	24	23	16	19	24	14	12	3	..	..	136	47	20	6	2	6	121	95	1	217	
Norwich.....	88	74	30	42	39	39	33	34	35	50	27	5	1	..	365	24	81	3	7	15	2	265	230	2	497
Old Lyme.....	3	..	..	..	..	2	..	3	..	4	1	..	..	..	10	3	..	..	..	..	8	5	..	13	
Old Saybrook....	2	2	..	..	1	1	2	1	2	2	5	..	..	..	14	3	..	1	..	..	7	11	..	18	
Orange.....	10	4	1	2	2	4	2	3	5	7	4	..	..	..	32	6	1	2	3	..	19	25	..	44	
Oxford.....	1	1	2	1	..	1	1	4	1	4	2	..	..	..	16	..	2	..	..	..	10	8	..	18	
Plainfield.....	7	4	..	1	7	3	3	2	2	3	6	..	..	..	23	15	..	..	..	..	23	15	..	38	
Plainville.....	3	2	2	1	..	1	..	1	2	1	1	..	..	..	9	2	1	1	1	..	7	7	..	14	
Plymouth.....	4	1	2	2	1	1	..	..	4	1	..	..	..	..	11	1	2	1	1	..	8	8	..	16	
Pomfret.....	7	1	..	..	3	5	1	1	4	6	..	..	..	..	21	7	..	..	..	..	19	9	..	28	
Portland.....	15	3	1	6	9	1	4	4	8	9	4	2	..	..	46	..	13	..	4	3	27	39	..	66	
Preston.....	4	2	1	4	6	3	2	6	5	5	1	1	..	..	..	..	..	..	40	19	21	..	..	40	
Prospect.....	..	..	..	..	1	2	1	1	2	..	..	..	..	..	6	1	..	..	..	..	5	2	..	7	
Putnam.....	28	16	15	9	9	11	9	9	6	7	2	..	..	..	62	21	6	23	9	..	55	63	3	121	
Redding.....	2	2	1	..	1	1	2	2	3	2	1	..	..	..	15	1	1	..	..	..	8	9	..	17	
Ridgefield.....	4	2	..	1	1	5	..	3	3	5	2	..	..	..	25	5	1	1	..	..	17	14	1	32	
Rocky Hill.....	1	..	..	1	..	3	2	..	3	1	2	..	..	..	9	1	2	..	1	..	3	10	..	13	
Roxbury.....	1	..	..	..	..	1	2	4	2	2	1	..	..	..	10	..	3	..	..	..	5	8	..	13	
Salem.....	..	..	..	..	1	..	1	..	2	3	..	..	..	..	7	..	..	..	..	..	4	3	..	7	
Salisbury.....	4	1	3	1	4	1	6	1	3	3	7	1	..	..	23	10	1	1	..	1	19	15	1	35	
Saybrook.....	5	2	..	..	1	..	..	2	1	2	5	2	..	..	17	3	..	..	..	..	12	8	..	20	
Scotland.....	1	2	1	..	1	1	..	..	2	1	..	..	..	..	9	..	..	..	..	..	3	6	..	9	
Seymour.....	9	3	5	4	4	3	2	3	3	1	2	..	..	..	30	2	2	1	1	..	19	18	..	37	
Sharon.....	4	2	..	3	1	1	1	3	2	6	2	..	..	..	14	5	2	..	4	..	15	10	..	25	
Sherman.....	3	1	..	..	1	2	2	2	3	..	..	..	..	..	13	1	..	..	..	..	9	5	..	14	
Simshury.....	3	8	1	4	4	2	2	2	3	6	3	..	..	..	33	7	7	3	..	..	28	22	..	50	
Somers.....	..	2	1	1	1	..	1	1	6	1	..	..	..	..	11	3	..	..	..	..	8	6	..	14	
Southbury.....	2	3	1	1	..	2	1	1	2	3	1	..	..	..	15	2	..	..	..	..	12	5	..	17	
Southington.....	14	17	6	3	9	5	5	6	7	8	2	..	..	..	65	5	10	1	..	1	48	34	..	82	
South Windsor...	4	1	3	..	2	1	4	3	4	1	..	..	..	..	20	1	1	..	..	1	9	12	2	23	
Spragne.....	8	14	2	7	3	2	3	2	5	3	2	..	..	..	28	5	6	1	1	9	1	29	22	..	51
Stafford.....	8	4	..	3	6	5	1	2	4	5	..	..	..	..	24	6	6	1	5	..	22	19	1	42	
Stamford.....	35	18	10	10	15	17	21	16	10	16	10	2	..	..	121	25	20	2	2	10	99	80	1	180	
Sterling.....	3	1	..	..	1	..	1	1	..	..	..	..	..	..	6	1	..	..	..	..	4	3	..	7	
Stonington.....	14	9	4	7	7	3	8	3	12	14	6	2	..	..	46	11	12	1	1	18	42	47	..	89	
Stratford.....	2	1	..	3	3	1	1	2	4	1	4	1	..	..	14	8	1	..	..	..	10	13	..	23	
Suffield.....	3	2	1	4	4	1	2	2	5	5	3	..	..	..	20	3	4	1	1	3	20	12	..	32	
Thomaston.....	4	5	4	3	4	4	2	2	1	1	..	..	..	..	25	2	1	1	1	..	16	14	..	30	

\* Twelve killed at Tariffville disaster, ages not given.

TABLE 4.—CONTINUED.

NAME OF TOWN.	Under 1.	1 to 5.		5 to 10.		10 to 20.		20 to 30.		30 to 40.		40 to 50.		50 to 60.		60 to 70.		70 to 80.		80 to 90.		90 to 100.		Unknown.	Birthplace, Connecticut.	Other States.	Birthplace, Ireland.	Birthplace, Germany.	Birthplace, England.	Other Foreign Countries.	Unknown.	Males.	Females.	Unknown.	Total.
Thompson.....	30	15	7	4	7	3	5	4	6	7	2	...	...	...	...	63	11	4	...	12	...	51	38	1	90										
Tolland.....	2	...	...	3	1	1	2	2	5	6	...	1	...	...	...	14	3	2	1	...	3	...	14	9	...	23									
Torrington.....	7	2	3	3	5	2	5	4	3	5	10	3	...	...	...	33	5	9	2	3	...	30	22	...	52										
Trumbull.....	3	...	4	...	2	1	2	...	3	3	2	...	...	...	...	18	2	...	...	...	...	8	12	...	20										
Union.....	...	...	...	...	...	2	1	1	...	...	2	...	...	...	...	6	...	...	...	...	...	2	4	...	6										
Vernon.....	34	15	4	8	8	6	10	8	6	5	1	...	...	...	...	70	9	6	12	4	4	...	57	48	...	105									
Voluntown.....	6	1	1	2	1	...	...	1	3	2	5	...	...	...	...	17	3	...	...	2	...	11	11	...	22										
Wallingford.....	8	5	11	14	3	8	10	6	4	9	7	...	...	...	...	61	7	13	1	2	1	...	44	40	1	85									
Warren.....	1	2	1	2	...	...	...	...	1	...	...	...	...	...	...	7	...	...	...	...	...	5	2	...	7										
Washington.....	3	...	2	1	1	2	1	1	4	...	2	...	...	...	...	14	1	2	...	...	...	8	9	...	17										
Waterbury.....	59	30	9	7	31	16	13	26	19	15	8	1	...	...	...	137	15	51	9	9	13	...	121	113	...	234									
Waterford.....	3	3	...	1	3	1	1	...	3	4	3	...	...	...	...	21	1	...	...	...	...	9	13	...	22										
Watertown.....	4	1	2	...	2	1	1	5	2	...	...	...	...	...	...	17	1	...	...	...	...	5	13	...	18										
Westbrook.....	...	6	1	...	1	2	1	2	1	4	2	2	...	...	...	19	3	...	...	...	...	9	13	...	22										
West Hartford...	...	3	2	2	3	2	4	2	3	3	1	...	...	...	...	19	2	...	1	...	3	8	17	...	25										
Weston.....	3	...	...	1	1	1	1	2	...	2	...	...	...	...	...	10	...	1	...	...	...	4	7	...	11										
Westport.....	8	3	1	...	1	2	4	7	8	8	6	3	...	...	...	39	6	4	2	...	...	30	20	1	51										
Wethersfield....	4	3	3	3	5	...	2	2	3	4	5	1	...	...	...	31	2	2	...	...	...	16	18	1	35										
Willington.....	4	1	...	2	1	1	2	2	1	2	5	...	...	...	...	15	4	1	1	...	...	12	9	...	21										
Wilton.....	1	1	...	...	2	3	4	2	6	8	3	1	...	...	...	8	1	...	1	21	...	12	19	...	31										
Winchester.....	8	11	11	11	3	2	6	10	5	6	6	...	...	...	...	63	6	7	...	3	...	40	38	1	79										
Windham.....	29	20	2	14	12	10	9	10	4	14	2	...	...	...	...	83	17	7	2	6	11	...	58	66	2	126									
Windsor.....	7	1	1	3	1	3	2	1	1	4	2	...	...	...	...	20	2	4	...	...	...	10	16	...	26										
Windsor Locks..	5	2	2	4	...	1	6	2	2	6	...	...	...	...	...	13	5	11	...	1	...	13	17	...	30										
Wolcott.....	...	1	...	...	...	...	...	1	1	1	1	...	...	...	...	5	...	...	...	...	...	2	3	...	5										
Woodbridge.....	1	...	2	...	2	1	1	1	4	1	...	...	...	...	...	10	1	...	1	...	...	2	11	...	13										
Woodbury.....	3	...	3	2	2	1	5	4	8	1	...	...	...	...	...	20	5	...	...	4	...	13	13	3	29										
Woodstock..	1	...	2	5	3	...	...	2	6	7	3	3	...	...	...	21	6	1	1	...	3	13	19	...	32										

## BIRTHS.

The total number of births reported during the year 1878 was 13,499, not including still births, which are returned with deaths. The most complete return of still births in the State, perhaps, is from New Haven, where a separate blank is provided, on tinted paper, to avoid confusion. This system is in use quite generally in the larger cities.

The returns of births are, as a rule, more incomplete than either those of deaths or marriages. The advantages of registration, it may be, are not so apparent, and it is most decidedly the exception that a child is named within a month after its birth. The record should, however, be promptly made and completed by the addition of the child's name as soon as conveniently obtainable. The provision in the law allowing the registrar a small fee for completing the record of a birth by obtaining the name, when, as is too often the case, it is omitted altogether, has been already of decided service in completing otherwise very imperfect records. Few outside of a registrar's office realize how frequently the information that a complete record affords is sought, and how important and valuable such facts are in the varied business and social relations of life.

The record of vital statistics is indeed as valuable as any of the other public records of a town, and it is as important that they be reliable and complete as that any public records should be; indeed, their interest and value often outlast any other of the facts that are deemed of sufficient importance to be made matters for public record and preservation.

Of these births 7,073 were males, 6,355 females,—an excess of 4,174 over the total number of deaths. The proportion of males to females is 109.74 males to every 100 females, or in each 100 births 50.174 were males, 49.826 females. The mean ratio for the twenty years ending 1876 was 110.44 males to every 100 females; in 1877, 109.18 males to 100 females. The following table shows the ratio in different countries:

France,	for every 100 females,	105.35 males.
England,	“ “ “ “	104.00 “
Austria,	“ “ “ “ - -	106.5 “
Russia,	“ “ “ “	105. “
Prussia,	“ “ “ “ -	105.4 “
Italy,	“ “ “ “	106.8 “

Switzerland, for every 100 females,	105.0	males.
Sweden,           "   "   "   "	105.0	"
Norway,           "   "   "   "	105.3	"
Belgium,          "   "   "   "	106.9	"
Holland,          "   "   "   "	105.7	"

According to the researches of Lund in Denmark, the first years of marriage are more fruitful of male births, and the latter of female, and the first child is, in the greater proportion of instances, a male. If the parties are each less than 25, the predominance of males is very marked,—105 to 50 females. This diminishes until, after fifteen years of married life, nearly an equal ratio exists,—49 males to 47 females. The ratio is then reversed, and soon reaches 95 males to 100 females. These observations extend over a long period of years, and are apparently very carefully made. The relative age of the parties, it is generally agreed, has a decided influence in deciding the sex, which is determined by that of the younger and more vigorous constitution.

There were 124 instances of plurality births—123 of twins, one of triplets—the latter of German parentage.,

There were 33 twin births in Hartford county, 30 in New Haven, 7 in New London, 28 in Fairfield, 12 in Windham, 14 in Litchfield, 7 in Middlesex, 3 in Tolland.

Of illegitimate births there were 128 reported, with about the same ratio of males to females as in the legitimate. They were distributed as follows: Hartford county, 36; New Haven, 25; New London, 17; Fairfield, 23; Windham, 11; Litchfield, 10; Middlesex, 4; Tolland, 2. The number is about the same as in 1876; in 1877 there were 155 reported.

The following table shows the parentage of foreign births. As it is the first published statement of the kind for this State it is impossible to give any comparative statements. The complexity of our population is here indicated, and it would hardly seem possible that so many heterogeneous elements were represented:

COUNTIES.	Irish.	English.	Scotch.	Canadians.	French.	Italians.	German.	Swedes.	Danes.	Norwegians.	Welsh.	Swiss.	Poles.	Chinese.
Hartford .....	532	58	21	20	20	6	88	7	3	1	2	2	2	1
New Haven.....	1,359	95	10	36	8	2	173	5	1	1	..	..	1	1
New London.....	314	65	71	165	4	2	56	..	..	..	1	..	1	..
Fairfield.....	480	65	4	..	3	4	111	8	1	2	2	2	4	..
Windham.....	190	20	1	336	10	..	10	1	..	..	..	4	..	..
Litchfield.....	257	22	..	..	20	..	32	3	..	..	..	1	..	..
Middlesex.....	141	12	2	..	3	2	20	12	..	2	..	1	..	..
Tolland.....	469	18	..	18	..	..	60	2	2	1	..	..	..	..
Total.....	3,742	355	109	575	68	16	542	38	7	7	5	10	8	2

Among other nationalities, Russia is represented by 1, the Azores 1, West Indies 4, Spain 1, Portugal 4, Siam 1, Nova Scotia 5, Sandwich Islands 2, Bohemia 1. Nearly all the nationalities of the world are here represented. A large Canadian immigration into the manufacturing towns is shown. These are for the most part French Canadians. There is a small Portuguese colony in New London, and a few in other portions of the State—sailors for the most part.

### MARRIAGES.

The number of marriages reported in 1878 was 4,315, a less number than for fourteen years, although the number has not varied half a score for the last three or four years. The pressure of the times, and the difficulties in the way of acquiring even a modest competence, show pretty uniformly in a decreased marriage rate. This is the lowest number reported since 1864, when but 4,107 were reported. Of these, 2,855 were of American birth, 721 foreign, and 674 of mixed nationality.

No marriages are reported from Hampton, Harwinton, New Fairfield, and Wolcott. Bridgewater, Morris, Marlborough, Brookfield, and Lisbon report one each, and Andover, Beacon Falls, Bethany, Burlington, Hartland, Middlefield, Prospect, and Willington report two each.

The number of colored marriages is also considerably less than in any preceding year for some time, in about the same relative proportion of decrease as those of the white population.

The only offset to this decrease in the number of marriages is in the fact of a considerable decrease in the number of divorces, a less number reported—401—than for many years, those already married apparently showing a disposition to live more peaceably.

To obviate complaints relative to confusion in the fees charged for issuing a marriage license, the following form was issued. As the old plates were found to be nearly worn out, an entire change was made in the general appearance of the blank, which is now upon one sheet, with the legal fee clearly printed on the reverse side, so that mistakes are no longer possible.

## STATE OF CONNECTICUT.

MARRIAGE LICENSE, valid only in the town where issued.

This certifies that the within named parties have declared their intention of marriage, and have complied with the provisions of the laws of the State of Connecticut relating to the Registration of Marriages.

Attest: ..... Registrar.

Town of ..... 18....

1. Full name of Groom,.....
2. Place of Residence,.....
3. Age, in years,.....
4. Occupation,.....
5. Place of birth,.....
6. Condition,.....
7. Color,.....
8. Nationality of parents,.... Father,..... Mother,.....
9. Full name of Bride,.....
10. Maiden name, if widow,.. ..
11. Place of residence,.....
12. Age, in years,.....
13. Place of birth,.....
14. Condition,.....
15. Color,.....
16. Nationality of parents,.... Father,..... Mother,....

I hereby certify that Mr. ....  
and M. .... the above named  
parties, were legally joined in marriage by me at. ....  
..... this..... day of..... 18....

Attest: .....



At 6 and 14 state whether first, second, third, etc., marriage; also whether widowed or divorced. At 8 and 16 state whether Irish, American, English, German, etc.

[REVERSE.]

#### TO REGISTRARS.

Registrars issuing a certificate of license for marriage where one of the parties is a minor, without the written consent of the parents or guardian, subject themselves to a fine of one hundred dollars.

#### FEE FOR ISSUING MARRIAGE LICENSE.

The legal fee for issuing a certificate of license for marriage is FIFTY CENTS.

#### TO CLERGYMEN AND MAGISTRATES.

This certificate, duly signed, should be returned to the Registrar by the person who joins the parties in marriage, within the first week of the month next succeeding such marriage, under penalty of ten dollars for neglect.

Any person solemnizing a marriage under this license in any other town than that in which it was issued, or joining any persons in marriage without first having received a certificate of license, is liable to a fine not exceeding five hundred dollars, or imprisonment in a common jail not exceeding one year, or both fine and imprisonment.

Sign this certificate of license with name, official title, and residence.

#### DEATHS.

The number of deaths recorded each year is an index of the annual loss to the State which necessarily results from the ebb and flow of the tide of life. The compensating swing is shown by the birth-rate; the gain, if gain there be, by the excess of births over deaths, and the influx of immigration; the latter, however, does not appear on the registration records. Prosperity is indicated by a high birth-rate and low death-rate, if the other elements in the problem correspond. Security to life, vigorous manhood, and peaceful old age, or the reverse; premature mortality, death at the threshold of life, wasted energies, and burdened age are unfolded in these records of the vital movements of the year. As the death-rate varies in different localities, and different years and

seasons, showing often double or even fivefold the normal rate, the importance of the study of these variations must be obvious, influenced as they are by local conditions.

The value of the sanitary observances of each locality is tested by the comparative freedom it enjoys from the devastations of diseases that should be controlled, and the reasonable expectation it can give of protection from influences that sap life and vigor, but yet over which the individual, however intelligent, has no control. The Austrian minister of commerce said, "Statistics are no longer viewed as a mere theoretical science for the gratification of the curiosity of the learned, since they subserve the practical ends of political society, and lend service to administration as well in determining the value of existing institutions and laws as in weighing measures not yet carried out." The intimate relation between political science or statesmanship and vital statistics is apparent as the varied relations of life to be influenced by legislative enactments alike are influenced by the laws of development and inheritance.

In studying the vital statistics of 1878, the chief effort has been expended in the selection and formation of tables that should present the different facts clearly and distinctly, and yet avoid any unnecessary detail. Some typographical errors in the construction of so many new forms of tabular statement are perhaps unavoidable; a glance at the factors that are credited with a wrong showing will rectify the errors in nearly every case. The first set of tables showing causes of death gives the cause for each death in the towns which are arranged by counties. By this table the manifestations of disease will be seen to fluctuate greatly from year to year; the same causes do not produce the annual mortality each year. There are, of course, certain endemic forms that appear from year to year, like consumption for instance, which is about as uniformly distributed as any one disease, but for the most part the causes vary very decidedly.

The value of this table will increase from year to year, and it forms indeed a very important item in the sanitary history of each town. These facts are yearly recorded and gathered, and by this means they are utilized to teach many an important lesson. But little attempt is made to draw inferences from these tables this year, as the exact basis of the census will render future calculations more valuable, and, indeed, scant time was left after constructing, with only general models, these comprehensive tables. The second

shows the age, time, and sex, with reference to each disease; for convenience of reference the diseases are arranged alphabetically. In the last table, the nationality, age, time, and sex of those dying in each town are shown, the towns arranged alphabetically.

The year was not characterized by the existence of any general epidemic, but localized epidemics of diphtheria, scarlet fever, and malarial fevers were very common. The greater proportion of deaths from these causes occurred in comparatively a few towns. Scarlet fever was more prevalent in the first quarter of the year, diphtheria in the third and fourth. There were some unusual causes reported. Mumps is credited with one death, but it was by metastasis to the glands about the windpipe, which, becoming enlarged, caused suffocation.

Bleeding at the nose, base ball, acute splenic fever, and lupus of the face are each credited with one death. Yellow fever was reported, but the death occurred at sea and the burial also; the captain of a ship imprudently landed at a fever-stricken port. The unusual number of deaths from accidents has already been alluded to. Two deaths are reported from exposure, and three from freezing, and three from lightning. Stricture of the œsophagus is reported in one case. The following table shows the deaths in each quarter:

From January to March,	2,385
From April to June,	2,176
From July to September,	2,586
From October to December,	2,157
Not stated,	48
	<hr/>
	9,352

The approximate ages are shown in the following statement:

Under 1,	1,074
From 1 to 5,	1,037
Total infantile,	<hr/>
	2,741
From 5 to 10,	565
From 10 to 20,	674
Total,	<hr/>
	1,239
From 20 to 30,	814
From 30 to 40,	772
From 40 to 50,	674
From 50 to 60,	689
Total,	<hr/>
	2,949

From 60 to 70,	773
From 70 to 80,	868
Over 80,	734
Total old age,	2,375
Age not stated,	48
	9,352

The infantile mortality is about the usual ratio, nearly thirty per cent., which does very well for human beings, but wouldn't do at all for sheep or cattle if the essential conditions of their vitality were so disregarded. The greater proportion of deaths occurs during the first twelve months, and disorders of nutrition are almost invariably the cause, although meningitis, convulsions, and brain disease are credited apparently with a large percentage.

The deaths during the third period represent the greatest loss to the State, as these are the producers, so to speak, who, in addition to self-support, are accumulating or supporting others. As will be seen by reference to the tables, the deaths from consumption and typhoid fever fall heaviest among this class.

The nationality is not quite so complicated as that of births, although decidedly heterogeneous. A much larger proportion are born within this State, and with the mixed population the birthplace is not so generally stated as in the case of births. The following statement shows the proportion:

Birthplace, Connecticut,	6,384
“ Other States,	970
“ Ireland,	946
“ England,	398
“ Germany,	175
“ Other Countries,	314
“ not stated,	165

The Canadians are proportionately as well represented as in the nativity of births, indicating a longer residence.

---

*Errata, page 56.*—Consumption, age not stated, 20; disease of brain, month not stated, 1, should be added.—Debility and atrophy, read 22 instead of 29, from '70 to '80, and 58 females instead of 38, making total 137. Page 27, footing of 5th column, read 13 instead of 70.

General Walker draws the following conclusions concerning the mortality among foreigners:

"Among the Irish, a marked liability to general constitutional diseases, including consumption and Bright's disease of the kidneys, with exemption comparatively from diseases of the febrile group." In this State the mortality from consumption in the factory towns among the operatives, is well marked, especially among the younger women. The change to indoor employment, with close restraint, and dust laden atmosphere manifests its effects after a comparatively short time.

Among the Germans, a reduced mortality from general constitutional diseases, and a decided liability to the febrile group, otherwise a general uniformity,—no undue prevalence of one group.

Among the English and Welsh, a liability to diseases of the nervous, circulatory, digestive, and integumentary systems,—comparative immunity from general constitutional diseases. Special forms scarlet fever, diphtheria, croup, whooping-cough, erysipelas, apoplexy, and paralysis are most fatal.

Among the Swedes, Norwegians, and Danes, a marked liability to diseases of the digestive system especially dysentery, diarrhea, and enteritis, and extraordinary mortality from the febrile group, immunity from deaths from general constitutional diseases, and from those of the circulatory, nervous, urinary, and integumentary systems.

Among the Scotch an evenness to the distribution among the several groups within marked, exception only of diseases of the nervous system, and of the organs of locomotion, cancer, paralysis, measles, and whooping cough, the most marked, immunity, small pox, scrofula, and the fevers.

Among the French the same evenness as in the Scotch, with more irregularity among the specific diseases than in case of the Scotch.

---

---

# L A W S

CONCERNING THE REGISTRATION OF

BIRTHS, MARRIAGES, AND DEATHS.

---

---





## REGISTRATION LAWS.\*

---

It shall be the duty of the State Board of Health to have the general supervision of the State system of registration of births, marriages, and deaths. Said board shall prepare the necessary methods and forms for obtaining and preserving such records, and to insure the faithful registration of the same in the several counties, and in the central bureau of vital statistics at the capital of the State. The said Board of Health shall recommend such forms and amendments of law as shall be deemed to be necessary for the thorough organization and efficiency of the registration of vital statistics throughout the State. The secretary of said Board of Health shall be the superintendent of registration of vital statistics. As supervised by the said board, the clerical duties and safe keeping of the bureau of vital statistics thus created shall be provided for by the Comptroller of the State, who shall also provide and furnish such apartments and stationery as said board shall require in the discharge of its duties. That the said board, on or before the first day of December in each year, shall make a report in writing to the Governor, upon the vital statistics and the sanitary condition and prospects of the State. †

SECTION 1. Every registrar of births, marriages, and deaths shall hold office for one year from the first Monday in January next succeeding his appointment, and until his successor is appointed and qualified.

SEC. 2. The registrar shall ascertain, as accurately as he can, all the births, marriages, and deaths occurring in his town, and record the same in a book or books kept by him for that purpose, in such form and with such particulars as shall be prescribed by law. He shall give licenses to marry, according to the provisions of law, and shall make and perfect all records of the birth of any child born in his town. He shall record in the books furnished

---

\* The following provisions are compiled from the unrepealed portions of the different statutes.

† January Session, 1878.

by the Bureau of vital statistics such facts concerning the births, marriages, and deaths in his town as may be therein required; and he shall amend his records as he may discover omissions or mistakes therein; annually, on or before the twenty-fifth day of January, shall send the superintendent of vital statistics an attested abstract of said records for the year next preceding the first day of said January, which shall be made in such form as shall be prescribed by said superintendent, and shall deposit a true copy thereof with the town clerk.

SEC. 3. Every physician or midwife, who shall have professional charge of the mother at the birth of any child, and every attendant who may act as midwife at such a time, where no physician or midwife is employed, shall, during the first week of the month next succeeding such birth, furnish the registrar of the town wherein such birth may have taken place a certificate signed by such physician, midwife, or attendant, stating, from the best information which the signer of said certificate can obtain, the facts required by the Bureau of Vital Statistics.

AN ACT CONCERNING THE REGISTRATION OF BIRTHS, MARRIAGES, AND DEATHS.

SECTION 1. The registrar, for completing each record of birth by inserting the full name of the child, shall receive from the town ten cents, and for ascertaining, recording, and indexing each birth of which no certificate has been furnished, fifty cents.

SEC. 2. Every physician residing without the town wherein a birth or death occurred under his charge shall make return thereof to the registrar of such town, and he shall receive therefor from the registrar an order on the treasurer of such town for the fee prescribed by law.

SEC. 3. No deceased person shall be buried in any town having an incorporated city within its limits until a burial permit, stating the place of burial and that the certificate of death required by law has been returned and recorded, has been given by the registrar, who upon receipt of such certificate shall issue such permit; and upon application, when permits are required, the attending physician of the deceased, and the coroner in case of an inquest, shall give such certificate; or if there be no attending physician, or his certificate cannot be obtained early enough, or where immediate burial is required, any member of the local board of health, or any physician employed to have charge of the poor

of said town or city, shall give such certificate to the best of his knowledge and belief, and the registrar shall record the place of any burial other than in a public cemetery, and, for each permit shall receive twenty-five cents from the town.

SEC. 4. In all towns the secretary or committee of each cemetery association shall report to the registrar of the town in which such cemetery is situated the name of the sexton at present in charge of such cemetery, and of any change hereafter.

SEC. 5. Every person having charge of any burial place shall during the first week of every month return a list, for which he shall receive fifty cents, of all the interments, disinterments, and removals made by him during the next preceding month, with the date thereof to the registrar of the town, who shall record the same in a book to be furnished by the bureau of vital statistics.

SEC. 6. Every person violating any of the provisions of this act shall be punished by a fine not exceeding twenty-five dollars.

SEC. 7. All acts and parts of acts inconsistent herewith are hereby repealed.

Approved, March 28, 1879.

#### AN ACT RELATING TO RETURNS OF DIVORCES.

SECTION 1. The returns of divorces required of clerks of the superior court to the State librarian, by section three, part sixteen, chapter one, title three of the general statutes, shall hereafter be made to the secretary of the State board of health, which returns shall be tabulated and published in the annual report of said board.

SEC. 2. This act shall take effect from its passage.

Approved, March 28, 1879.

#### TOWN OR CITY BY-LAWS.

Any town or city may enact by-laws, not contrary to law, more effectually to obtain a perfect registration of births, marriages, and deaths; and the registrar of the town in which such by-laws may be enacted shall execute their provisions under the same oath and penalty as if they were the statute laws of the State.

#### FEEES.

Registrars of births, marriages, and deaths shall receive for ascertaining and recording each birth, marriage, or death ten

cents; for issuing a certificate of license for marriage, fifty cents; for making an abstract, two dollars; for each name on such abstract over two hundred, two cents.

No person shall open any grave for the disinterment of the body of any deceased person, in any public or private cemetery or burial-place, or disinter or remove such dead body from the town in which the death took place, without having procured from the registrar a permit therefor.—Feb. 28, 1877.

#### DISINTERMENTS.

On the receipt by the registrar of a certificate of death, properly made in the form furnished by the superintendent of vital statistics, the registrar shall issue a permit for the disinterment or removal of the body of any deceased person, stating therein the locality of the interment, disinterment, or removal. No permit for the disinterment of the body of any deceased person during the months of June, July, August, or September shall be issued, except when required for the purposes of a legal investigation.

Every registrar of births, marriages, and deaths shall receive for issuing each permit as herein provided the sum of twenty-five cents.—Feb. 28, 1877.

#### RETURNS OF BIRTHS AND DEATHS.\*

*Duties of Persons who Shall Make Returns of Births and Deaths to the Registrars.*

##### BIRTHS.

Physicians or midwives, or any person acting as midwife at the birth of a child, should make return of the same, upon the blanks furnished by the Registrar, within the first week of the month next succeeding such birth, signed by the person making the returns, stating the facts therein required from the best information which the signer can obtain. Each birth should be promptly reported, and the record of the name inserted afterwards. Parents should be instructed to report the name to the physician or registrar as soon as determined. A provision is made for a fee for the registrar on completion of an imperfect record.

##### DEATHS.

It is the duty of the attending physician to report on the blanks furnished by the registrar each death, with all the facts required

---

\* The following suggestions concerning the provisions of the registration laws are given in reply to questions that have been submitted.

by law. In cities, this certificate of death should be in the hands of the registrar before a burial permit is issued. There is no other way to secure complete returns of deaths in populous places than by the system of burial permits. The testimony is unanimous on this point. By reference to the bulletins of the National Health Board it will be seen that the cities which do not require a burial permit previous to interment are rapidly becoming exceptional. The attention of physicians is respectfully urged to the requirement for promptly filling out certificates of death. A little care on their part will save a great deal of unnecessary friction. If the cause of death be written in by the physician, and the certificate signed by him, the other facts can be readily filled out by the undertaker.

It is the duty of the physician to sign the certificate of death *forthwith*. The friends of the deceased should secure from the attending physician as soon as may be after death the certificate required by law, and furnish it to the registrar, who shall then issue the permit for burial. Proper respect for the dead demands at least that much attention be paid to their memory. The friends of the deceased are the proper persons to arrange this matter, to see that the facts concerning the last event in life about which the State concerns itself with relation to each citizen be correctly stated. The business and social elements involved also justify the utmost precision and care. Protection of life and prevention of crime are also involved in this transaction.

Where burial permits are not required, the physician should return the certificates of death each month to fulfill the requirements of the law. Negligence here is by far too common.

#### COMPENSATION.

The fee for returning the certificates of birth and death is twenty-five cents. The penalty for violation or non-compliance with the registration laws relating to returns of births and deaths, is not less than ten dollars, nor more than twenty-five dollars.

### DUTIES OF PERSONS BEFORE WHOM MARRIAGES MAY BE SOLEMNIZED.

#### AUTHORITY AND ITS LIMITATIONS.

All judges, justices of the peace, and ordained or licensed clergymen belonging to this State or any other State, so long as they continue in the work of the ministry, may join persons in marriage,



and all marriages attempted to be celebrated by any other person shall be void; but all marriages which shall be solemnized according to the forms and usages of any religious denomination in this State shall be valid.

Marriage within certain degrees of consanguinity is by law declared void.

#### CERTIFICATE OF LICENSE FOR MARRIAGE REQUIRED PREVIOUSLY TO THE CEREMONY.

No clergyman or magistrate is authorized to solemnize a marriage until a certificate of license is first delivered to him, under penalty of a fine of not more than five hundred dollars, or imprisonment, one or both. The marriage license can be used only in the town where it was issued; if used in any other town, the officiating clergyman or magistrate is liable to a fine of not less than one hundred dollars, or imprisonment, one or both.

#### RECORD AND RETURN REQUIRED.

Every clergyman or magistrate is required by law to return to the Registrar, within the first week of the month next ensuing, the license certificates, with the fact, time, and place of each marriage certified thereon for all marriages celebrated by him during the month preceding, under a penalty of ten dollars for each omission.

*The certificates should be signed with name and official title.*

### LAWS CONCERNING MARRIAGE.

#### (GENERAL STATUTES, TITLE XIV.)

##### *Chap. I.*

SEC. 1. What Kindred cannot Marry.

SEC. 2. Marriage License.

SEC. 3. Certificate of Marriage.

SEC. 4. Certificates *prima facie* evidence.

SEC. 5. Who may join persons in marriage.

#### SECTION 1. Marriage between certain relatives prohibited.

SEC. 2. No persons shall be married until one of them shall inform the registrar of the town in which the marriage is to be celebrated, or in case of his inability the town clerk, of the name, age, color, occupation, birth-place, residence, and condition (whether single, widowed, or divorced) of each. Such registrar or town clerk shall thereupon issue his certificate that the parties therein named have complied with the provisions of this section, which

certificate shall be a license to any person authorized to celebrate marriage to join in marriage within said town only the parties therein named; but no such certificate shall be issued if either of the parties is a minor under the control of parent or guardian, until such parent or guardian shall give to the registrar or town clerk his written consent; and any registrar or town clerk who shall knowingly issue such certificate without such consent shall forfeit to the State one hundred dollars. And any person who shall join any persons in marriage without having received such certificate shall forfeit one hundred dollars.

SEC. 3. Every person who shall join any person in marriage shall certify upon the license certificate the fact, time, and place of such marriage, and return it to the registrar of the town where it was issued, upon or during the first week of the month next succeeding such marriage, and upon failure thereof shall forfeit ten dollars. The penalties for joining persons in marriage in violation of this and the preceding section shall be paid to the town where the offense is committed, and the registrar shall sue therefor.

SEC. 4. The certificates required by the preceding sections of this chapter shall be *prima facie* evidence of the facts therein stated.

SEC. 5. All judges, justices of the peace, and ordained or licensed clergymen belonging to this State or any other State, as long as they continue in the work of the ministry, may join persons in marriage; and all marriages attempted to be celebrated by any other person shall be void; but all marriages and rites which shall be solemnized according to the forms and usages of any religious denomination in the State shall be valid.

## TITLE 20. CHAP. II.

SEC. 17. Every person who shall knowingly publish a false and fictitious notice of any birth, marriage, or death shall be fined not more than one hundred dollars, or imprisoned not more than six months.

### *Chap. VII.*

SEC. 2. Penalty for bigamy: imprisonment in State Prison not more than five years.

SEC. 3. Every man and woman who shall marry within any of the degrees of kindred specified in the first section Chapter I, Title XIV, shall be imprisoned in the State Prison not less than two nor more than five years.

SEC. 21. Whoever undertakes to join persons in marriage, knowing that he is not authorized so to do, shall be fined not more than five hundred dollars, or imprisoned not more than one year, or both.

### DUTIES OF REGISTRARS.

The registrar is the executive officer in each town for the registration laws, and it is his duty to see that they are complied with. It is his duty to make his record as complete as he can. Special provision is made by the act of 1879 for the completion of returns of births by securing the name of the child. The records of births are of little worth without the name.

In cities he is to issue burial permits when required by law, and also permits for removal from one town to another. In case of disinterment or removal from one cemetery to another in the same town a permit is not required.

He shall record the facts required by law concerning births, marriages, and deaths in the record books furnished by the State, and should refuse to receive a certificate, glaringly defective, as a satisfactory performance of the returns required by law. Where the required facts are manifestly unobtainable, of course a virtue must be made of necessity, and the incomplete returns accepted.

It is the duty of the registrar to issue marriage licenses on receiving a declaration of intention of marriage from one of the parties, and to record all marriages returned to him as solemnized in his town. In case of his inability the town clerk shall perform these duties.—*General Statutes, Title 3, Part V, Sec. 2.* The registrar is forbidden by law, under penalty of one hundred dollars, to issue a marriage license when either of the parties is a minor, under the control of a parent or guardian, unless such parent or guardian shall give to the registrar his written consent.

### DUTIES OF SEXTONS.

Every person having in charge a burial place shall return to the registrar a monthly list of all interments, disinterments, and removals, in case there be any during the month. For such list he is entitled to a fee of fifty cents from the town.

## CONTENTS OF REGISTRATION REPORT.

---

General Statement,	5
Statistics of Colored Population,	7
Divorces,	7
Nomenclature of Diseases,	9
Table showing Births, Marriages, and Deaths in each Town, arranged by Counties :	
Hartford County,	13
New Haven County,	14
New London “	15
Fairfield “	16
Windham “	17
Litchfield “	18
Middlesex “	19
Tolland “	20
Recapitulation,	21
Table showing Births during each Month, Causes of Death, arranged by Towns and Counties :	
Hartford County,	23
New Haven, “	27
New London “	31
Fairfield “	35
Windham “	39
Litchfield “	43
Middlesex “	47
Tolland “	51
Recapitulation,	53
Causes of Death, arranged by Month, Age, and Sex, Dis- eases arranged Alphabetically,	56
Causes of Death Distinguished by Age and Sex, Towns arranged Alphabetically,	60—75

Births—General Remarks,	64
Marriages, “ “	66
Deaths, “ “	68
Registration Laws,	75











YALE UNIVERSITY LIBRARY



3 9002 04391 2238

